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(FILE 'HOME' ENTERED AT 09:02:17 ON 22 AUG 2006)

FILE 'HCAPLUS' ENTERED AT 09:03:35 ON 22 AUG 2006

E US20060025633/PN

L1 1 SEA ABB=ON PLU=ON US20060025633/PN
D SCAN
SEL RN

FILE 'REGISTRY' ENTERED AT 09:04:07 ON 22 AUG 2006

L2 26 SEA ABB=ON PLU=ON (12027-38-2/BI OR 12027-43-9/BI OR
12411-74-4/BI OR 12501-23-4/BI OR 1314-23-4/BI OR
1333-74-0/BI OR 1343-93-7/BI OR 1344-28-1/BI OR
13463-67-7/BI OR 14644-61-2/BI OR 352-93-2/BI OR
39290-95-4/BI OR 7439-88-5/BI OR 7440-02-0/BI OR
7440-04-2/BI OR 7440-05-3/BI OR 7440-06-4/BI OR
7440-16-6/BI OR 7440-18-8/BI OR 7440-44-0/BI OR
7440-48-4/BI OR 75-08-1/BI OR 7631-86-9/BI OR 7647-10-1
/BI OR 7783-06-4/BI OR 84973-55-7/BI)

D SCAN

E THIOETHER/CN

L3 2601 SEA ABB=ON PLU=ON B8/PG AND 1/ELC.SUB

L4 1 SEA ABB=ON PLU=ON 7783-06-4/RN

L5 1 SEA ABB=ON PLU=ON 1333-74-0/RN

D SCAN

E H3O40PW12/MF

L6 129 SEA ABB=ON PLU=ON (H(L)O(L)P(L)W)/ELS(L)4/ELC.SUB

L7 58 SEA ABB=ON PLU=ON L6 AND H2O

L8 2 SEA ABB=ON PLU=ON L7 AND L2

D SCAN

L9 45 SEA ABB=ON PLU=ON L7 AND O40PW12

L10 7 SEA ABB=ON PLU=ON L7 AND O62P2W18

D SCAN

L11 72 SEA ABB=ON PLU=ON (H(L)O(L)SI(L)W)/ELS(L)4/ELC.SUB

L12 2 SEA ABB=ON PLU=ON L11 AND L2

D SCAN

L13 51 SEA ABB=ON PLU=ON L11 AND O40SIW12

L14 36 SEA ABB=ON PLU=ON L13 AND H2O

L15 1 SEA ABB=ON PLU=ON 1314-23-4/RN

L16 1 SEA ABB=ON PLU=ON 39290-95-4/RN

D SCAN

D SCAN L15

FILE 'HCAPLUS' ENTERED AT 09:37:50 ON 22 AUG 2006

D SCAN L1

FILE 'REGISTRY' ENTERED AT 09:37:50 ON 22 AUG 2006

L17 1 SEA ABB=ON PLU=ON 7631-86-9/RN

D SCAN

L18 42 SEA ABB=ON PLU=ON (S(L)O(L)ZR)/ELS(L)3/ELC.SUB

L19 14 SEA ABB=ON PLU=ON L18 AND O4S

D SCAN

L20 53 SEA ABB=ON PLU=ON (W(L)O(L)ZR)/ELS(L)3/ELC.SUB

L21 19 SEA ABB=ON PLU=ON L20 NOT AYS/CI

D SCAN

L22 34 SEA ABB=ON PLU=ON L20 NOT L21

FILE 'HCAPLUS' ENTERED AT 09:45:46 ON 22 AUG 2006

L23 26082 SEA ABB=ON PLU=ON MERCAPTAN

L24 146017 SEA ABB=ON PLU=ON MERCAPT?

L25 14375 SEA ABB=ON PLU=ON THIOETHER OR THIO(A)ETHER

D SCAN L1

L26 114741 SEA ABB=ON PLU=ON L4 OR (HYDROGEN OR H2 OR H) (A) (SULP
HIDE OR SULFIDE OR S) OR H2S

L27 1006379 SEA ABB=ON PLU=ON L3

L28 19 SEA ABB=ON PLU=ON L25 AND L26 AND L27
 L29 QUE ABB=ON PLU=ON STRONG? (A) ACID?
 L30 1 SEA ABB=ON PLU=ON L29 AND L28
 D SCAN
 L31 1588885 SEA ABB=ON PLU=ON CATALY? OR ACTIVATOR? OR ACCELERANT
 ? OR ENHANCER? OR ACCELERAT!R?
 L32 13 SEA ABB=ON PLU=ON L28 AND L31
 D SCAN TI
 D SCAN L1
 L33 8446 SEA ABB=ON PLU=ON L23 (L) PREP?
 L34 3 SEA ABB=ON PLU=ON L33 AND L28
 D SCAN
 L35 8 SEA ABB=ON PLU=ON L28 AND ACID?
 D SCAN
 L36 299 SEA ABB=ON PLU=ON (L23 OR L25) AND L26 AND L27
 L37 2 SEA ABB=ON PLU=ON L36 AND L29
 D SCAN
 L38 169 SEA ABB=ON PLU=ON L36 AND L31
 L39 6 SEA ABB=ON PLU=ON L38 AND L35
 D SCAN
 L40 26 SEA ABB=ON PLU=ON L38 AND L33
 L41 135 SEA ABB=ON PLU=ON L8
 L42 1467 SEA ABB=ON PLU=ON L12
 L43 1468 SEA ABB=ON PLU=ON LL41 OR L42
 L44 1 SEA ABB=ON PLU=ON L28 AND L43
 D SCAN
 L45 2 SEA ABB=ON PLU=ON L43 AND L33
 D SCAN
 L46 42478 SEA ABB=ON PLU=ON L24 (L) PREP?
 L47 41 SEA ABB=ON PLU=ON L46 AND (L36 OR L28)
 L48 26 SEA ABB=ON PLU=ON L47 AND L31
 D SCAN TI
 D QUE
 L49 2 SEA ABB=ON PLU=ON L48 AND L43
 D SCAN
 L50 10047 SEA ABB=ON PLU=ON HETEROPOLYACID? OR HETERO(A) POLYACI
 D? OR HETERO (2A) POLY (2A) ACID? OR HETEROPOLY (A) ACID?
 L51 1 SEA ABB=ON PLU=ON L50 AND L28
 D SCAN
 L52 3 SEA ABB=ON PLU=ON L36 AND L50
 D SCAN
 L53 254 SEA ABB=ON PLU=ON L9
 L54 162 SEA ABB=ON PLU=ON L14
 L55 355 SEA ABB=ON PLU=ON L53 OR L54
 L56 1 SEA ABB=ON PLU=ON L28 AND L55
 D QUE
 L57 2789 SEA ABB=ON PLU=ON L6
 L58 1587 SEA ABB=ON PLU=ON L11
 L59 3582 SEA ABB=ON PLU=ON L57 OR L58
 L60 1 SEA ABB=ON PLU=ON L28 AND L59
 D SCAN

FILE 'REGISTRY' ENTERED AT 11:39:35 ON 22 AUG 2006

L61 1 SEA ABB=ON PLU=ON 1344-28-1/RN
 D SCAN
 L62 1 SEA ABB=ON PLU=ON 1343-93-7/RN
 D SCAN
 L63 1 SEA ABB=ON PLU=ON 12027-38-2/RN
 D SCAN
 L64 1 SEA ABB=ON PLU=ON 12027-43-9/RN
 D SCAN
 L65 1 SEA ABB=ON PLU=ON 12411-74-4/RN
 D SCAN
 E POTASSIUM/CN
 L66 1 SEA ABB=ON PLU=ON POTASSIUM/CN
 E RUBIDIUM/CN

L67 1 SEA ABB=ON PLU=ON RUBIDIUM/CN
 L68 1 SEA ABB=ON PLU=ON RUBIDIN/CN
 D SCAN
 D CN
 E CAESIUM/CN
 E CESIUM/CN
 L69 1 SEA ABB=ON PLU=ON CESIUM/CN
 D SCAN
 E AMMONIUM/CN
 L70 1 SEA ABB=ON PLU=ON AMMONIUM/CN
 D SCAN

 FILE 'HCAPLUS' ENTERED AT 11:50:56 ON 22 AUG 2006
 L71 QUE ABB=ON PLU=ON L66 OR POTASSIUM
 L72 QUE ABB=ON PLU=ON L67 OR RUBIDIUM OR L68
 L73 QUE ABB=ON PLU=ON L69 OR CESIUM
 L74 QUE ABB=ON PLU=ON L70 OR AMMONIUM
 L75 126 SEA ABB=ON PLU=ON ((L71 OR L72 OR L73 OR L74) OR K
 OR RB OR CS OR NH4) (L) L59
 L76 1 SEA ABB=ON PLU=ON L75 AND L28
 D SCAN
 D QUE STAT
 L77 1 SEA ABB=ON PLU=ON L26 AND L27 AND L76
 L78 215241 SEA ABB=ON PLU=ON ((L71 OR L72 OR L73 OR L74) OR K
 OR RB OR CS OR NH4) (2A) (SALT? OR CATION OR ION OR X OR
 HALOGEN)
 L79 235 SEA ABB=ON PLU=ON L78 AND L59
 L80 3 SEA ABB=ON PLU=ON L79 AND ((L23 OR L24 OR L25))
 D SCAN
 L81 1 SEA ABB=ON PLU=ON L80 AND L26 AND L27
 L82 92912 SEA ABB=ON PLU=ON L15
 L83 90 SEA ABB=ON PLU=ON L19
 L84 205 SEA ABB=ON PLU=ON L18
 L85 377 SEA ABB=ON PLU=ON L20
 L86 57 SEA ABB=ON PLU=ON ((L82 OR L83 OR L84 OR L85)) AND
 (L28 OR L46)
 L87 2 SEA ABB=ON PLU=ON ((L82 OR L83 OR L84 OR L85)) AND
 L28
 D SCAN
 L88 23 SEA ABB=ON PLU=ON L59 AND L26
 L89 5 SEA ABB=ON PLU=ON L88 AND L27
 D SCAN
 E ZEOLITE/CT
 L90 118887 SEA ABB=ON PLU=ON ZEOLIT?
 L91 48578 SEA ABB=ON PLU=ON CATION? (2A) (RESIN? OR POLYM? OR
 HOMOPOLY? OR COPOLYM? OR (CO OR TER) (W) POLYM? OR
 TERPOLYM?)
 L92 152 SEA ABB=ON PLU=ON (L75 OR L59 OR L79) AND ((L82 OR
 L83 OR L84 OR L85))
 L93 1 SEA ABB=ON PLU=ON L92 AND L90 AND L91
 D SCAN
 L94 2 SEA ABB=ON PLU=ON L92 AND L26 AND (L24 OR L25)
 D SCAN
 L95 23 SEA ABB=ON PLU=ON L30 OR L32 OR (L34 OR L35) OR L37
 OR L39 OR (L44 OR L45) OR L49 OR (L51 OR L52) OR L56
 OR L60 OR (L76 OR L77) OR (L80 OR L81) OR L87 OR L89
 OR L93 OR L94
 D SCAN TI CC
 L96 46 SEA ABB=ON PLU=ON L95 OR L40
 L97 QUE ABB=ON PLU=ON L17 OR SILICA OR SIO2 OR(SILICON
 OR SI) (A) (DIOXIDE OR OXIDE OR O2)
 L98 QUE ABB=ON PLU=ON L61 OR ALUMINA OR AL2O3 OR
 (ALUMINUM OR ALUMINIUM OR AL) (A) (OXIDE OR O3)
 D SCAN L1

FILE 'REGISTRY' ENTERED AT 12:30:01 ON 22 AUG 2006

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      E TIO2/MF
L99      18 SEA ABB=ON PLU=ON O2TI/MF
      E CARBON/CN
      E CARBON ACT/CN
      E ACTIVATED CARBON/CN
L100     1 SEA ABB=ON PLU=ON ACTIVATED CARBON/CN
      D SCAN
      E PHOSPHOTUNGSTIC ACID/CN

FILE 'HCAPLUS' ENTERED AT 12:37:38 ON 22 AUG 2006
L101     QUE ABB=ON PLU=ON L99 OR (TITANIUM OR TI) (A) (DIOXIDE
      OR OXIDE OR O2) OR TIO2
L102     QUE ABB=ON PLU=ON L82 OR ZIRCONIA OR (ZIRCONIUM OR
      ZR) (A) (DIOXIDE OR O2 OR OXIDE) OR ZRO2
L103     QUE ABB=ON PLU=ON (L100 OR CARBON OR C OR CHARCOAL) (A
      )ACTIVAT?
L104     12 SEA ABB=ON PLU=ON L96 AND ((L97 OR L98) OR (L101 OR
      L102 OR L103))
      D SCAN
L105     46 SEA ABB=ON PLU=ON L96 OR L104
L106     28 SEA ABB=ON PLU=ON L105 AND (L33 OR L46)
      D SCAN TI
      D SCAN
      D QUE L28
L107     3 SEA ABB=ON PLU=ON L28 AND L106
      D SCAN L1
L108     QUE ABB=ON PLU=ON L5 OR (HYDROGEN OR H2) (A) (ELEMENT?
      OR GAS? OR FEED? OR REACT?)
L109     358 SEA ABB=ON PLU=ON L108 AND L26 AND (L24 OR L25)
      D QUE
L110     9 SEA ABB=ON PLU=ON L105 AND L109
      D SCAN
      D SCAN TI CC
      D SCAN L1
L111     3 SEA ABB=ON PLU=ON L105 AND CLEAV?
      D SCAN
L112     QUE ABB=ON PLU=ON (L105 OR L106 OR L107) OR L110 OR
      L111
L113     7 SEA ABB=ON PLU=ON L112 AND 23/SC,SX
L114     10 SEA ABB=ON PLU=ON L112 AND 45/SC,SX
L115     9 SEA ABB=ON PLU=ON L112 AND 67/SC,SX
L116     18 SEA ABB=ON PLU=ON (L113 OR L114 OR L115)
L117     4 SEA ABB=ON PLU=ON L28 AND L108
      D SCAN
L118     28 SEA ABB=ON PLU=ON ((L112 OR L113 OR L114 OR L115 OR
      L116 OR L117)) AND L46
L119     6 SEA ABB=ON PLU=ON L118 AND L108 AND L26 AND L27
      D SCAN
      D QUE L46
L120     27252 SEA ABB=ON PLU=ON L24 (3A) (PRODUC? OR PROD# OR
      GENERAT? OR MANUF? OR MFR# OR CREAT? OR FORM## OR
      FORMING# OR FORMAT? OR MAKE# OR MADE# OR MAKIN# OR
      FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)
L121     11 SEA ABB=ON PLU=ON L120 AND L118
      D SCAN
      D SCAN TI CC
L122     26589 SEA ABB=ON PLU=ON ?MERCAP? (2A) (PRODUC? OR PROD# OR
      GENERAT? OR MANUF? OR MFR# OR CREAT? OR FORM## OR
      FORMING# OR FORMAT? OR MAKE# OR MADE# OR MAKIN# OR
      FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)
L123     11 SEA ABB=ON PLU=ON L122 AND (L121 OR L105)
      D SCAN TI
L124     32494 SEA ABB=ON PLU=ON ?THIOL? (2A) (PRODUC? OR PROD# OR
      GENERAT? OR MANUF? OR MFR# OR CREAT? OR FORM## OR
      FORMING# OR FORMAT? OR MAKE# OR MADE# OR MAKIN# OR
      FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)

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L125 12 SEA ABB=ON PLU=ON L124 AND L105
 D SCAN TI
 L126 19 SEA ABB=ON PLU=ON L117 OR L119 OR L121 OR L123 OR
 L125
 D SCAN TI CC
 L127 QUE ABB=ON PLU=ON 6/SC,SX
 L128 QUE ABB=ON PLU=ON 59/SC,SX
 L129 17 SEA ABB=ON PLU=ON L126 NOT (L127 OR L128)
 L130 15 SEA ABB=ON PLU=ON L129 NOT FUEL?/SC,SX
 L131 15 SEA ABB=ON PLU=ON L130 AND (L96 OR (L104 OR L105 OR
 L106 OR L107) OR (L110 OR L111 OR L112 OR L113 OR L114
 OR L115 OR L116 OR L117 OR L118 OR L119) OR L121 OR
 L123 OR L125 OR L126 OR L129)
 D SCAN
 L132 3 SEA ABB=ON PLU=ON L131 AND L59
 D SCAN
 L133 2 SEA ABB=ON PLU=ON L131 AND L50
 L134 3 SEA ABB=ON PLU=ON L132 OR L133
 D SCAN
 D L134 1-3 HITSTR

FILE 'REGISTRY' ENTERED AT 13:53:33 ON 22 AUG 2006

D SCAN L61
 D SCAN L62
 D SCAN L63
 D SCAN L64
 D SCAN L65
 D SCAN L66

FILE 'HCAPLUS' ENTERED AT 13:54:43 ON 22 AUG 2006

L135 2413 SEA ABB=ON PLU=ON L62
 L136 1375 SEA ABB=ON PLU=ON L63
 L137 97 SEA ABB=ON PLU=ON L64
 L138 115 SEA ABB=ON PLU=ON L65
 L139 3 SEA ABB=ON PLU=ON L131 AND ((L135 OR L136 OR L137 OR
 L138))
 L140 1 SEA ABB=ON PLU=ON L55 AND L131
 D SCAN
 L141 1 SEA ABB=ON PLU=ON L55 AND L105
 L142 3 SEA ABB=ON PLU=ON (L139 OR L140 OR L141)
 L143 3 SEA ABB=ON PLU=ON L142 AND L134
 L144 12 SEA ABB=ON PLU=ON L131 NOT L143

=> => d que stat l143

L2 26 SEA FILE=REGISTRY ABB=ON PLU=ON (12027-38-2/BI OR
 12027-43-9/BI OR 12411-74-4/BI OR 12501-23-4/BI OR
 1314-23-4/BI OR 1333-74-0/BI OR 1343-93-7/BI OR
 1344-28-1/BI OR 13463-67-7/BI OR 14644-61-2/BI OR
 352-93-2/BI OR 39290-95-4/BI OR 7439-88-5/BI OR
 7440-02-0/BI OR 7440-04-2/BI OR 7440-05-3/BI OR
 7440-06-4/BI OR 7440-16-6/BI OR 7440-18-8/BI OR
 7440-44-0/BI OR 7440-48-4/BI OR 75-08-1/BI OR 7631-86-9
 /BI OR 7647-10-1/BI OR 7783-06-4/BI OR 84973-55-7/BI)
 L3 2601 SEA FILE=REGISTRY ABB=ON PLU=ON B8/PG AND 1/ELC.SUB
 L4 1 SEA FILE=REGISTRY ABB=ON PLU=ON 7783-06-4/RN
 L5 1 SEA FILE=REGISTRY ABB=ON PLU=ON 1333-74-0/RN
 L6 129 SEA FILE=REGISTRY ABB=ON PLU=ON (H(L)O(L)P(L)W)/ELS(L
)4/ELC.SUB
 L7 58 SEA FILE=REGISTRY ABB=ON PLU=ON L6 AND H2O
 L9 45 SEA FILE=REGISTRY ABB=ON PLU=ON L7 AND O40PW12
 L11 72 SEA FILE=REGISTRY ABB=ON PLU=ON (H(L)O(L)SI(L)W)/ELS(L
)4/ELC.SUB
 L12 2 SEA FILE=REGISTRY ABB=ON PLU=ON L11 AND L2
 L13 51 SEA FILE=REGISTRY ABB=ON PLU=ON L11 AND O40SIW12

L14 36 SEA FILE=REGISTRY ABB=ON PLU=ON L13 AND H2O
 L15 1 SEA FILE=REGISTRY ABB=ON PLU=ON 1314-23-4/RN
 L17 1 SEA FILE=REGISTRY ABB=ON PLU=ON 7631-86-9/RN
 L18 42 SEA FILE=REGISTRY ABB=ON PLU=ON (S(L)O(L)ZR)/ELS(L)3/
 ELC.SUB
 L19 14 SEA FILE=REGISTRY ABB=ON PLU=ON L18 AND O4S
 L20 53 SEA FILE=REGISTRY ABB=ON PLU=ON (W(L)O(L)ZR)/ELS(L)3/
 ELC.SUB
 L23 26082 SEA FILE=HCAPLUS ABB=ON PLU=ON MERCAPTAN
 L24 146017 SEA FILE=HCAPLUS ABB=ON PLU=ON MERCAPT?
 L25 14375 SEA FILE=HCAPLUS ABB=ON PLU=ON THIOETHER OR THIO(A)ET
 HER
 L26 114741 SEA FILE=HCAPLUS ABB=ON PLU=ON L4 OR (HYDROGEN OR H2
 OR H) (A) (SULPHIDE OR SULFIDE OR S) OR H2S
 L27 1006379 SEA FILE=HCAPLUS ABB=ON PLU=ON L3
 L28 19 SEA FILE=HCAPLUS ABB=ON PLU=ON L25 AND L26 AND L27
 L29 QUE ABB=ON PLU=ON STRONG? (A)ACID?
 L30 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L29 AND L28
 L31 1588885 SEA FILE=HCAPLUS ABB=ON PLU=ON CATALY? OR ACTIVATOR?
 OR ACCELERANT? OR ENHANCER? OR ACCELERAT!R?
 L32 13 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L31
 L33 8446 SEA FILE=HCAPLUS ABB=ON PLU=ON L23 (L) PREP?
 L34 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L33 AND L28
 L35 8 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND ACID?
 L36 299 SEA FILE=HCAPLUS ABB=ON PLU=ON (L23 OR L25) AND L26
 AND L27
 L37 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L36 AND L29
 L38 169 SEA FILE=HCAPLUS ABB=ON PLU=ON L36 AND L31
 L39 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L38 AND L35
 L40 26 SEA FILE=HCAPLUS ABB=ON PLU=ON L38 AND L33
 L42 1467 SEA FILE=HCAPLUS ABB=ON PLU=ON L12
 L43 1468 SEA FILE=HCAPLUS ABB=ON PLU=ON L41 OR L42
 L44 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L43
 L45 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L43 AND L33
 L46 42478 SEA FILE=HCAPLUS ABB=ON PLU=ON L24 (L) PREP?
 L47 41 SEA FILE=HCAPLUS ABB=ON PLU=ON L46 AND (L36 OR L28)
 L48 26 SEA FILE=HCAPLUS ABB=ON PLU=ON L47 AND L31
 L49 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L48 AND L43
 L50 10047 SEA FILE=HCAPLUS ABB=ON PLU=ON HETEROPOLYACID? OR
 HETERO(A) POLYACID? OR HETERO (2A) POLY(2A)ACID? OR
 HETEROPOLY (A) ACID?
 L51 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L28
 L52 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L36 AND L50
 L53 254 SEA FILE=HCAPLUS ABB=ON PLU=ON L9
 L54 162 SEA FILE=HCAPLUS ABB=ON PLU=ON L14
 L55 355 SEA FILE=HCAPLUS ABB=ON PLU=ON L53 OR L54
 L56 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L55
 L57 2789 SEA FILE=HCAPLUS ABB=ON PLU=ON L6
 L58 1587 SEA FILE=HCAPLUS ABB=ON PLU=ON L11
 L59 3582 SEA FILE=HCAPLUS ABB=ON PLU=ON L57 OR L58
 L60 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L59
 L61 1 SEA FILE=REGISTRY ABB=ON PLU=ON 1344-28-1/RN
 L62 1 SEA FILE=REGISTRY ABB=ON PLU=ON 1343-93-7/RN
 L63 1 SEA FILE=REGISTRY ABB=ON PLU=ON 12027-38-2/RN
 L64 1 SEA FILE=REGISTRY ABB=ON PLU=ON 12027-43-9/RN
 L65 1 SEA FILE=REGISTRY ABB=ON PLU=ON 12411-74-4/RN
 L66 1 SEA FILE=REGISTRY ABB=ON PLU=ON POTASSIUM/CN
 L67 1 SEA FILE=REGISTRY ABB=ON PLU=ON RUBIDIUM/CN
 L68 1 SEA FILE=REGISTRY ABB=ON PLU=ON RUBIDIN/CN
 L69 1 SEA FILE=REGISTRY ABB=ON PLU=ON CESIUM/CN
 L70 1 SEA FILE=REGISTRY ABB=ON PLU=ON AMMONIUM/CN
 L71 QUE ABB=ON PLU=ON L66 OR POTASSIUM
 L72 QUE ABB=ON PLU=ON L67 OR RUBIDIUM OR L68
 L73 QUE ABB=ON PLU=ON L69 OR CESIUM
 L74 QUE ABB=ON PLU=ON L70 OR AMMONIUM
 L75 126 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L71 OR L72 OR L73

OR L74) OR K OR RB OR CS OR NH4) (L) L59
 L76 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L75 AND L28
 L77 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L26 AND L27 AND L76
 L78 215241 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L71 OR L72 OR L73
 OR L74) OR K OR RB OR CS OR NH4) (2A) (SALT? OR CATION
 OR ION OR X OR HALOGEN)
 L79 235 SEA FILE=HCAPLUS ABB=ON PLU=ON L78 AND L59
 L80 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L79 AND ((L23 OR L24
 OR L25))
 L81 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L80 AND L26 AND L27
 L82 92912 SEA FILE=HCAPLUS ABB=ON PLU=ON L15
 L83 90 SEA FILE=HCAPLUS ABB=ON PLU=ON L19
 L84 205 SEA FILE=HCAPLUS ABB=ON PLU=ON L18
 L85 377 SEA FILE=HCAPLUS ABB=ON PLU=ON L20
 L87 2 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L82 OR L83 OR L84
 OR L85)) AND L28
 L88 23 SEA FILE=HCAPLUS ABB=ON PLU=ON L59 AND L26
 L89 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L88 AND L27
 L90 118887 SEA FILE=HCAPLUS ABB=ON PLU=ON ZEOLIT?
 L91 48578 SEA FILE=HCAPLUS ABB=ON PLU=ON CATION? (2A) (RESIN? OR
 POLYM? OR HOMOPOLY? OR COPOLYM? OR (CO OR TER) (W) POLYM?
 OR TERPOLYM?)
 L92 152 SEA FILE=HCAPLUS ABB=ON PLU=ON (L75 OR L59 OR L79)
 AND ((L82 OR L83 OR L84 OR L85))
 L93 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L92 AND L90 AND L91
 L94 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L92 AND L26 AND (L24
 OR L25)
 L95 23 SEA FILE=HCAPLUS ABB=ON PLU=ON L30 OR L32 OR (L34 OR
 L35) OR L37 OR L39 OR (L44 OR L45) OR L49 OR (L51 OR
 L52) OR L56 OR L60 OR (L76 OR L77) OR (L80 OR L81) OR
 L87 OR L89 OR L93 OR L94
 L96 46 SEA FILE=HCAPLUS ABB=ON PLU=ON L95 OR L40
 L97 QUE ABB=ON PLU=ON L17 OR SILICA OR SIO2 OR (SILICON
 OR SI) (A) (DIOXIDE OR OXIDE OR O2)
 L98 QUE ABB=ON PLU=ON L61 OR ALUMINA OR AL2O3 OR (ALUMIN
 UM OR ALUMINIUM OR AL) (A) (OXIDE OR O3)
 L99 18 SEA FILE=REGISTRY ABB=ON PLU=ON O2TI/MF
 L100 1 SEA FILE=REGISTRY ABB=ON PLU=ON ACTIVATED CARBON/CN
 L101 QUE ABB=ON PLU=ON L99 OR (TITANIUM OR TI) (A) (DIOXIDE
 OR OXIDE OR O2) OR TIO2
 L102 QUE ABB=ON PLU=ON L82 OR ZIRCONIA OR (ZIRCONIUM OR Z
 R) (A) (DIOXIDE OR O2 OR OXIDE) OR ZRO2
 L103 QUE ABB=ON PLU=ON (L100 OR CARBON OR C OR CHARCOAL) (A)
 ACTIVAT?
 L104 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 AND ((L97 OR L98)
 OR (L101 OR L102 OR L103))
 L105 46 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 OR L104
 L106 28 SEA FILE=HCAPLUS ABB=ON PLU=ON L105 AND (L33 OR L46)
 L107 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L106
 L108 QUE ABB=ON PLU=ON L5 OR (HYDROGEN OR H2) (A) (ELEMENT?
 OR GAS? OR FEED? OR REACT?)
 L109 358 SEA FILE=HCAPLUS ABB=ON PLU=ON L108 AND L26 AND (L24
 OR L25)
 L110 9 SEA FILE=HCAPLUS ABB=ON PLU=ON L105 AND L109
 L111 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L105 AND CLEAV?
 L112 QUE ABB=ON PLU=ON (L105 OR L106 OR L107) OR L110 OR
 L111
 L113 7 SEA FILE=HCAPLUS ABB=ON PLU=ON L112 AND 23/SC, SX
 L114 10 SEA FILE=HCAPLUS ABB=ON PLU=ON L112 AND 45/SC, SX
 L115 9 SEA FILE=HCAPLUS ABB=ON PLU=ON L112 AND 67/SC, SX
 L116 18 SEA FILE=HCAPLUS ABB=ON PLU=ON (L113 OR L114 OR
 L115)
 L117 4 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L108
 L118 28 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L112 OR L113 OR
 L114 OR L115 OR L116 OR L117)) AND L46

L119 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L118 AND L108 AND L26 AND L27

L120 27252 SEA FILE=HCAPLUS ABB=ON PLU=ON L24(3A) (PRODUC? OR PROD# OR GENERAT? OR MANUF? OR MFR# OR CREAT? OR FORM## OR FORMING# OR FORMAT? OR MAKE# OR MADE# OR MAKIN# OR FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)

L121 11 SEA FILE=HCAPLUS ABB=ON PLU=ON L120 AND L118

L122 26589 SEA FILE=HCAPLUS ABB=ON PLU=ON ?MERCAP?(2A) (PRODUC? OR PROD# OR GENERAT? OR MANUF? OR MFR# OR CREAT? OR FORM## OR FORMING# OR FORMAT? OR MAKE# OR MADE# OR MAKIN# OR FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)

L123 11 SEA FILE=HCAPLUS ABB=ON PLU=ON L122 AND (L121 OR L105)

L124 32494 SEA FILE=HCAPLUS ABB=ON PLU=ON ?THIOL?(2A) (PRODUC? OR PROD# OR GENERAT? OR MANUF? OR MFR# OR CREAT? OR FORM## OR FORMING# OR FORMAT? OR MAKE# OR MADE# OR MAKIN# OR FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)

L125 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L124 AND L105

L126 19 SEA FILE=HCAPLUS ABB=ON PLU=ON L117 OR L119 OR L121 OR L123 OR L125

L127 QUE ABB=ON PLU=ON 6/SC,SX

L128 QUE ABB=ON PLU=ON 59/SC,SX

L129 17 SEA FILE=HCAPLUS ABB=ON PLU=ON L126 NOT (L127 OR L128)

L130 15 SEA FILE=HCAPLUS ABB=ON PLU=ON L129 NOT FUEL?/SC,SX

L131 15 SEA FILE=HCAPLUS ABB=ON PLU=ON L130 AND (L96 OR (L104 OR L105 OR L106 OR L107) OR (L110 OR L111 OR L112 OR L113 OR L114 OR L115 OR L116 OR L117 OR L118 OR L119) OR L121 OR L123 OR L125 OR L126 OR L129)

L132 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L131 AND L59

L133 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L131 AND L50

L134 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L132 OR L133

L135 2413 SEA FILE=HCAPLUS ABB=ON PLU=ON L62

L136 1375 SEA FILE=HCAPLUS ABB=ON PLU=ON L63

L137 97 SEA FILE=HCAPLUS ABB=ON PLU=ON L64

L138 115 SEA FILE=HCAPLUS ABB=ON PLU=ON L65

L139 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L131 AND ((L135 OR L136 OR L137 OR L138))

L140 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L55 AND L131

L141 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L55 AND L105

L142 3 SEA FILE=HCAPLUS ABB=ON PLU=ON (L139 OR L140 OR L141)

L143 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L142 AND L134

=> d l143 1-3 ibib abs hitstr hitind

L143 ANSWER 1 OF 3 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:249306 HCAPLUS

DOCUMENT NUMBER: 140:289188

TITLE: **Catalytic process for
fabrication of alkyl
mercaptans by the addition reaction of
hydrogen sulfide with
alkenes**

INVENTOR(S): Fremy, Georges; Essayem, Nadine; Lacroix, Michel; Zausa, Elodie

PATENT ASSIGNEE(S): Atofina, Fr.

SOURCE: Fr. Demande, 14 pp.

CODEN: FRXXBL

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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FR 2844794          A1      20040326      FR 2002-11923
                                           2002
                                           0925

FR 2844794          B1      20041203
CA 2499629          AA      20040408      CA 2003-2499629
                                           2003
                                           0923

WO 2004029005       A1      20040408      WO 2003-FR2789
                                           2003
                                           0923

W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,
    CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI,
    GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG,
    KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,
    MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU,
    SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,
    UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM,
    AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,
    DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL,
    PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN,
    GQ, GW, ML, MR, NE, SN, TD, TG

AU 2003282186       A1      20040419      AU 2003-282186
                                           2003
                                           0923

EP 1542944          A1      20050622      EP 2003-773806
                                           2003
                                           0923

R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,
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    EE, HU, SK
CN 1701053          A       20051123      CN 2003-825392
                                           2003
                                           0923

JP 2006500416       T2      20060105      JP 2004-539125
                                           2003
                                           0923

US 2006111591       A1      20060525      US 2005-528901
                                           2005
                                           1220

PRIORITY APPLN. INFO.:      FR 2002-11923      A
                                           2002
                                           0925

                                WO 2003-FR2789      W
                                           2003
                                           0923

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OTHER SOURCE(S): MARPAT 140:289188

AB Alkyl **mercaptans** (e.g., Et **mercaptan**) are prepared by the addition reaction of an olefin (e.g., ethylene) with **hydrogen sulfide** in the presence of hydrogen and a **catalytic** composition including a **strong acid**, such as a **heteropoly acid** (e.g., 12-phosphotungstic acid) and at least 1 Group VIIIIB metal (e.g., Pd/SiO₂).

IT 12027-38-2, Silicotungstic acid 39290-95-4, Zirconium tungstate

RL: CAT (Catalyst use); USES (Uses)

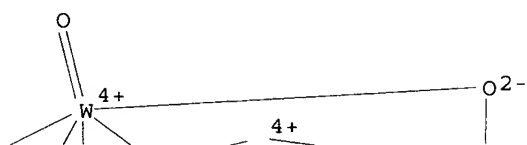
(addition reaction **catalyst** with Group VIIIIB metals in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)

RN 12027-38-2 HCAPLUS

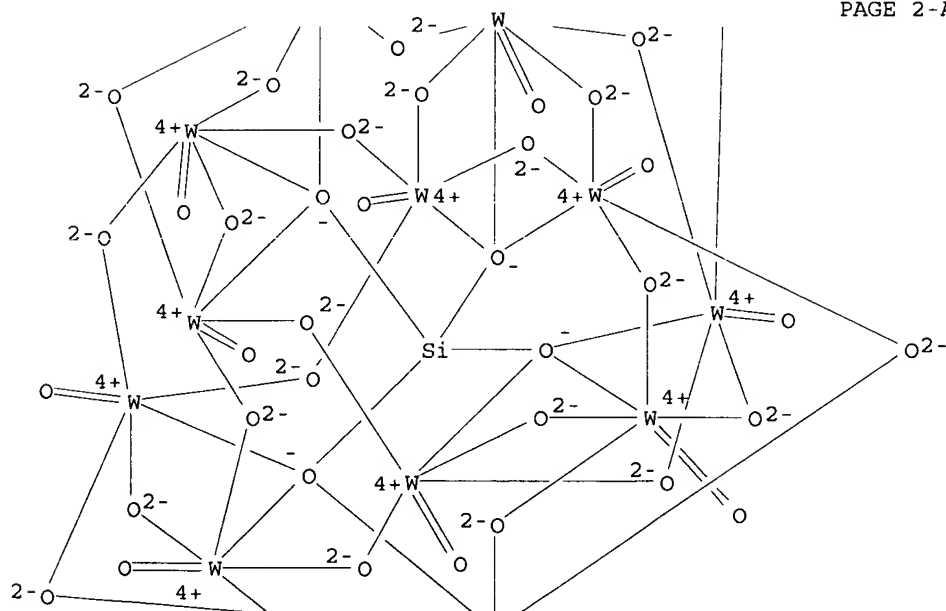
CN Tungstate(4-), [μ₁₂-[orthosilicato(4-)-

$\kappa O:\kappa O:\kappa O':\kappa O':\kappa O':\kappa O'$
 $';\kappa O''';\kappa O''':\kappa O''':\kappa O''':\kappa O''']$]tetra
 cosa-μ-oxododecaoxododeca-, tetrahydrogen (9CI) (CA INDEX
 NAME)

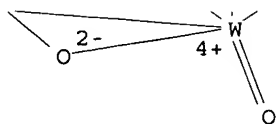
PAGE 1-A



PAGE 2-A



PAGE 3-A

● 4 H⁺

RN 39290-95-4 HCAPLUS
 CN Tungsten zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	x	17778-80-2
Zr	x	7440-67-7
W	x	7440-33-7

IT 7439-88-5, Iridium, uses 7439-89-6, Iron, uses
 7440-02-0, Nickel, uses 7440-04-2, Osmium, uses
 7440-05-3, Palladium, uses 7440-06-4, Platinum,
 uses 7440-16-6, Rhodium, uses 7440-18-8,
 Ruthenium, uses 7440-48-4, Cobalt, uses
 RL: CAT (Catalyst use); USES (Uses)
 (addition reaction catalyst with heteropoly
 acids in the manufacture of alkyl
 mercaptans by the addition reaction of hydrogen
 sulfide with alkenes)

RN 7439-88-5 HCAPLUS
 CN Iridium (8CI, 9CI) (CA INDEX NAME)

Ir

RN 7439-89-6 HCAPLUS
 CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-02-0 HCAPLUS
 CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-04-2 HCAPLUS
 CN Osmium (8CI, 9CI) (CA INDEX NAME)

Os

RN 7440-05-3 HCAPLUS
 CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

RN 7440-06-4 HCAPLUS
 CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-16-6 HCAPLUS
 CN Rhodium (8CI, 9CI) (CA INDEX NAME)

Rh

RN 7440-18-8 HCAPLUS
 CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

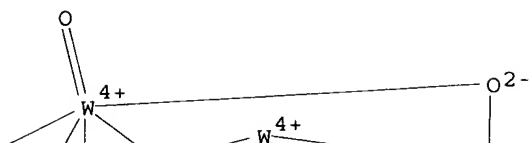
Ru

RN 7440-48-4 HCAPLUS
 CN Cobalt (8CI, 9CI) (CA INDEX NAME)

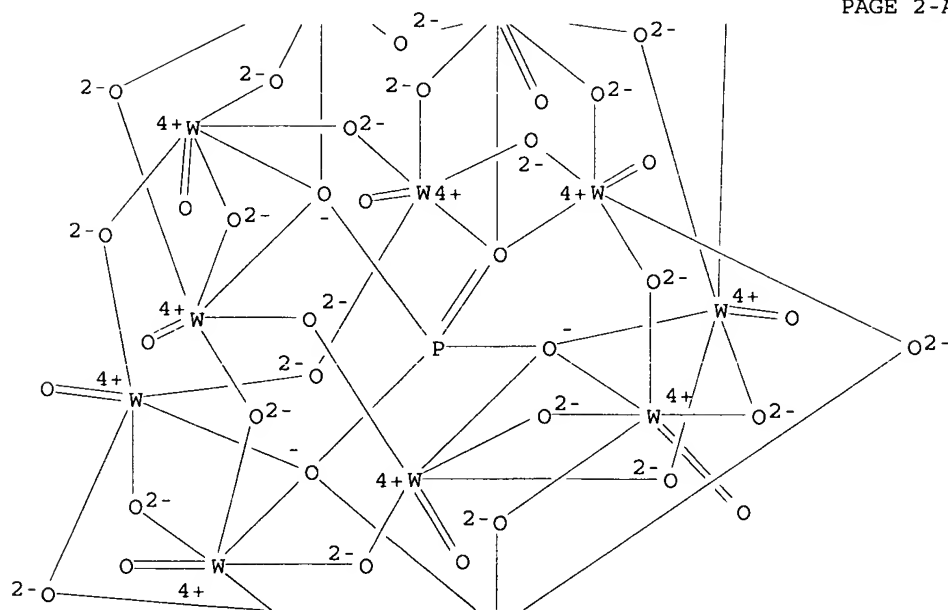
Co

IT 1343-93-7, 12-Phosphotungstic acid
 RL: CAT (Catalyst use); USES (Uses)
 (addition reaction **catalysts** with Group VIIIB metals in
 the **manufacture** of alkyl **mercaptans** by the addition
 reaction of **hydrogen sulfide** with alkenes)
 RN 1343-93-7 HCAPLUS
 CN Tungstate(3-), tetracosam-oxododecaoxo[μ12-[phosphato(3-)-
 κO:κO:κO:κO':κO':κO':κO'
 ':κO':κO':κO':κO':κO':κO']dodec
 a-, trihydrogen (9CI) (CA INDEX NAME)

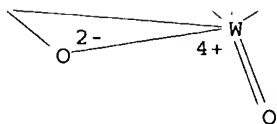
PAGE 1-A



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●3 H⁺

IT 7783-06-4, **Hydrogen sulfide**, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (catalytic process for **fabrication** of alkyl
mercaptans by the addition reaction of **hydrogen**
sulfide with alkenes)
 RN 7783-06-4 HCAPLUS
 CN Hydrogen sulfide (H₂S) (8CI, 9CI) (CA INDEX NAME)

H₂S

IT 1333-74-0, **Hydrogen**, reactions
 RL: RGT (Reagent); RACT (Reactant or reagent)
 (catalytic process for **fabrication** of alkyl
mercaptans by the addition reaction of **hydrogen**
sulfide with alkenes)
 RN 1333-74-0 HCAPLUS
 CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 7631-86-9, **Silica**, uses
 RL: CAT (Catalyst use); USES (Uses)
 (support; addition reaction **catalyst** with Group VIIIB
 metals in the **manufacture** of alkyl **mercaptans** by
 the addition reaction of **hydrogen sulfide** with
 alkenes)
 RN 7631-86-9 HCAPLUS
 CN Silica (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

O=Si=O

IC ICM C07C319-04
 ICS B01J023-40; B01J023-74; B01J103-52
 CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and
 Waxes)
 Section cross-reference(s): 23, 48, 67
 ST alkyl **mercaptan** **manuf** alkene **catalytic**
addn **reaction** **hydrogen** **sulfide**;
ethanethiol **manuf** **ethylene** **catalytic**
addn **reaction** **hydrogen** **sulfide**;
ethyl **mercaptan** **manuf** **ethene** **catalytic**
addn **reaction** **hydrogen** **sulfide**
 IT Cation exchangers
 (acidic; addition reaction **catalysts** with Group VIIIB
 metals in the **manufacture** of alkyl **mercaptans** by
 the addition reaction of **hydrogen sulfide** with
 alkenes)

- IT Zeolites (synthetic), uses
 RL: CAT (Catalyst use); USES (Uses)
 (addition reaction **catalyst** with Group VIIIB metals in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT Platinum-group metals
 RL: CAT (Catalyst use); USES (Uses)
 (addition reaction **catalyst** with **heteropoly acids** in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT **Heteropoly acids**
 RL: CAT (Catalyst use); USES (Uses)
 (addition reaction **catalysts** with Group VIIIB metals in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT Group VIII elements
 RL: CAT (Catalyst use); USES (Uses)
 (addition reaction **catalysts** with **heteropoly acids** in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT **Thiols, preparation**
 RL: IMF (Industrial manufacture); PREP (Preparation)
 (**catalytic** process for **fabrication** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT Alkenes, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (**catalytic** process for **fabrication** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT Addition reaction
 (for **fabrication** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT Addition reaction **catalysts**
 (**heteropoly acids** and Group VIIIB metals in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT 7440-09-7, Potassium, uses 7440-17-7, Rubidium, uses 7440-46-2, Cesium, uses 12027-38-2, Silicotungstic acid 12067-99-1, Phosphotungstic acid 14644-61-2, Zirconium sulfate 14798-03-9, Ammonium, uses 39290-95-4, Zirconium tungstate
 RL: CAT (Catalyst use); USES (Uses)
 (addition reaction **catalyst** with Group VIIIB metals in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7440-02-0, Nickel, uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-48-4, Cobalt, uses
 RL: CAT (Catalyst use); USES (Uses)
 (addition reaction **catalyst** with **heteropoly acids** in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT 1343-93-7, 12-Phosphotungstic acid
 RL: CAT (Catalyst use); USES (Uses)
 (addition reaction **catalysts** with Group VIIIB metals in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT 75-08-1P, Ethyl **mercaptan**
 RL: IMF (Industrial manufacture); PREP (Preparation)

(catalytic process for fabrication of alkyl mercaptans by the addition reaction of hydrogen sulfide with alkenes)

IT 74-85-1, Ethylene, reactions 7783-06-4, Hydrogen sulfide, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)
(catalytic process for fabrication of alkyl mercaptans by the addition reaction of hydrogen sulfide with alkenes)

IT 1333-74-0, Hydrogen, reactions

RL: RGT (Reagent); RACT (Reactant or reagent)
(catalytic process for fabrication of alkyl mercaptans by the addition reaction of hydrogen sulfide with alkenes)

IT 7631-86-9, Silica, uses

RL: CAT (Catalyst use); USES (Uses)
(support; addition reaction catalyst with Group VIIIIB metals in the manufacture of alkyl mercaptans by the addition reaction of hydrogen sulfide with alkenes)

REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L143 ANSWER 2 OF 3 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:249291 HCAPLUS

DOCUMENT NUMBER: 140:270552

TITLE: Catalytic process for
manufacturing of mercaptans
by hydrogen sulfide-
cleavage of thioether in the
presence of H2

INVENTOR(S): Fremy, Georges; Essayem, Nadine; Lacroix,
Michel; Zausa, Elodie

PATENT ASSIGNEE(S): Atofina, Fr.

SOURCE: Fr. Demande, 15 pp.

CODEN: FRXXBL

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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FR 2844726	A1	20040326	FR 2002-11922	2002 0925
FR 2844726	B1	20041203		
CA 2499632	AA	20040408	CA 2003-2499632	2003 0923
WO 2004029022	A2	20040408	WO 2003-FR2790	2003 0923
WO 2004029022	A3	20040506		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,
CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG,
KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,
MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU,
SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM,
AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,
DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL,

PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG

AU 2003282187 A1 20040419 AU 2003-282187 2003
0923

EP 1542795 A2 20050622 EP 2003-773807 2003
0923

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,
MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ,
EE, HU, SK

CN 1694761 A 20051109 CN 2003-825118 2003
0923

JP 2006500417 T2 20060105 JP 2004-539126 2003
0923

US 2006025633 A1 20060202 US 2005-528861 2005
0323

PRIORITY APPLN. INFO.: FR 2002-11922 A 2002
0925

WO 2003-FR2790 W 2003
0923

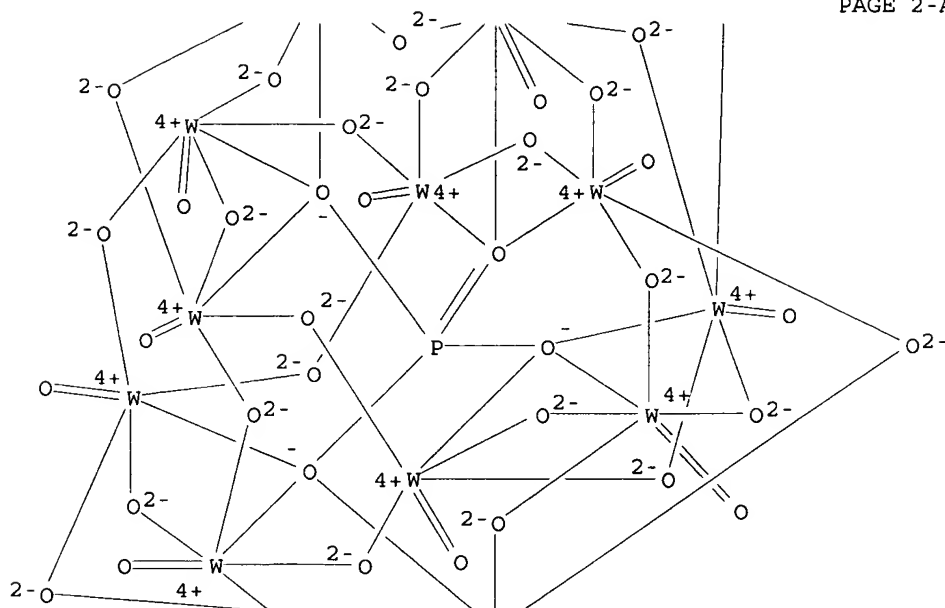
OTHER SOURCE(S): MARPAT 140:270552

AB The invention is directed to a **catalytic** process for
preparation mercaptans RSR' from **thioether**
and **hydrogen sulfide**, in the presence of
hydrogen and of a **catalytic** composition including a
strong acid, in particular a
heteropolyacids, and at least a Group VIII metal [R, R' =
independently cyclo/alkyl]. The advantages include lower reaction
temps., high yield and purity of **mercaptans**, and high
activity of the **catalyst** in time. Thus, mixing an aqueous
solution of SiO₂ with PdCl₂ and H₃PW₁₂O₄₀ (HPW) gave a
catalytic composition consisting of 59% SiO₂, 1% Pd,
and 40% HPW. Et **mercaptan** was **prepared**, in
49.3% yield, by **hydrogen sulfide-**
cleavage of di-Et sulfide in the presence of H₂ and the
above **catalytic** composition at 15 bar and 235°.

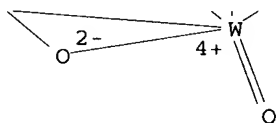
IT 1314-23-4, Zirconium dioxide, uses
1343-93-7D, potassium, rubidium,
cesium, ammonium salts
1344-28-1, Alumina, uses 7439-88-5,
Iridium, uses 7440-02-0, Nickel, uses 7440-04-2
, Osmium, uses 7440-05-3, Palladium, uses
7440-06-4, Platinum, uses 7440-16-6, Rhodium,
uses 7440-48-4, Cobalt, uses 7631-86-9,
Silica, uses 12027-38-2D, potassium,
rubidium, cesium, ammonium
salts 12027-43-9 12411-74-4D,
potassium, rubidium, cesium,
ammonium salts 12501-23-4
13463-67-7, Titanium dioxide, uses
39290-95-4, Zirconium tungstate 84973-55-7
RL: CAT (Catalyst use); USES (Uses)
(**catalytic** composition component; **preparation** of
mercaptans by **hydrogen sulfide-**
cleavage of **thioether** in the presence of H₂,
and a **catalyst** composition, in particular
heteropolyacids/Pd/SiO₂)

RN 1314-23-4 HCAPLUS

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PAGE 3-A

● 3 H⁺

RN 1344-28-1 HCAPLUS
 CN Aluminum oxide (Al₂O₃) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 7439-88-5 HCAPLUS
 CN Iridium (8CI, 9CI) (CA INDEX NAME)

Ir

RN 7440-02-0 HCAPLUS
 CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-04-2 HCAPLUS
 CN Osmium (8CI, 9CI) (CA INDEX NAME)

Os

RN 7440-05-3 HCAPLUS
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

RN 7440-06-4 HCAPLUS
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-16-6 HCAPLUS
CN Rhodium (8CI, 9CI) (CA INDEX NAME)

Rh

RN 7440-48-4 HCAPLUS
CN Cobalt (8CI, 9CI) (CA INDEX NAME)

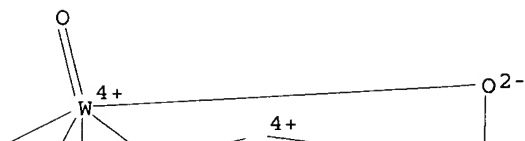
Co

RN 7631-86-9 HCAPLUS
CN Silica (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

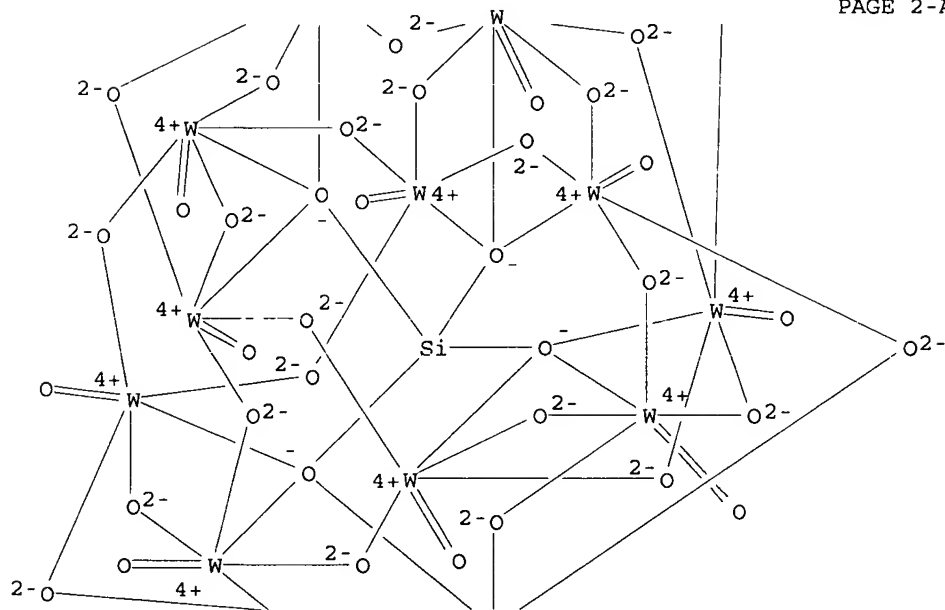
O=Si=O

RN 12027-38-2 HCAPLUS
CN Tungstate(4-), [μ12-[orthosilicato(4-)-
κO:κO:κO:κO':κO':κO':κO'
' :κO':κO':κO':κO':κO']tetra
cosa-μ-oxododecaoxododeca-, tetrahydrogen (9CI) (CA INDEX
NAME)

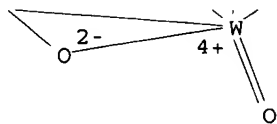
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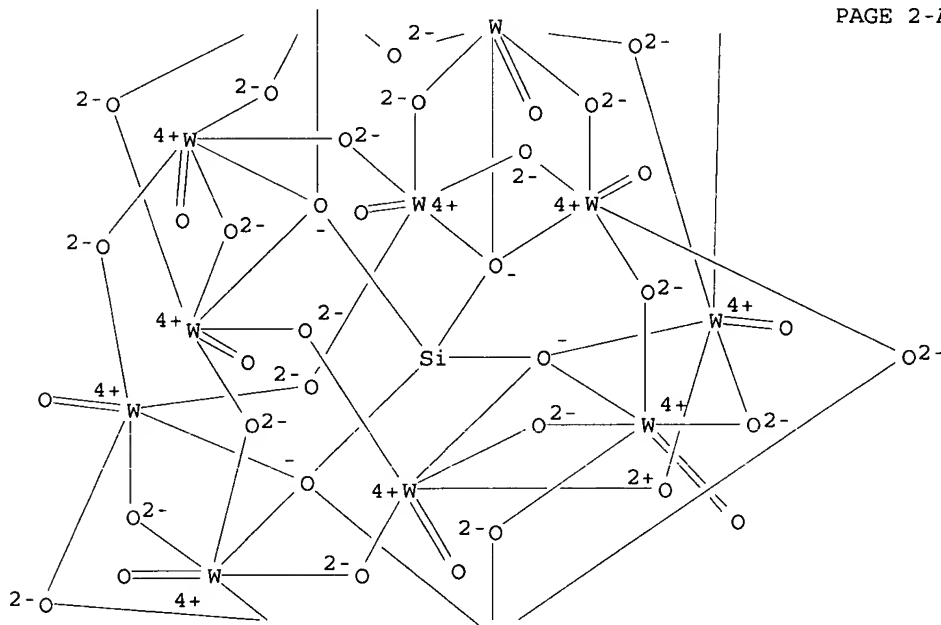
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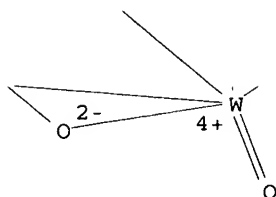
● 4 H⁺

RN 12027-43-9 HCAPLUS
 CN Tungstate(4-), [μ12-[orthosilicato(4-)-
 κO:κO:κO:κO':κO':κO':κO'
 ':κO':κO':κO':κO':κO':κO']tetra
 cosa-μ-oxododecaoxododeca-, tetrahydrogen, hydrate (9CI) (CA
 INDEX NAME)

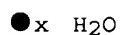
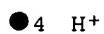
* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT
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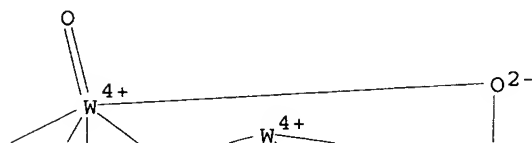


RN 12411-74-4 HCAPLUS
 CN Tungstate(6-), hexatriaconta-μ-oxooctadeca-oxobis[μ9-
 [phosphato(3-)-κO:κO:κO:κO':κO':.kap
 pa.O':κO':κO':κO']octadeca-, hexahydrogen
 (9CI) (CA INDEX NAME)

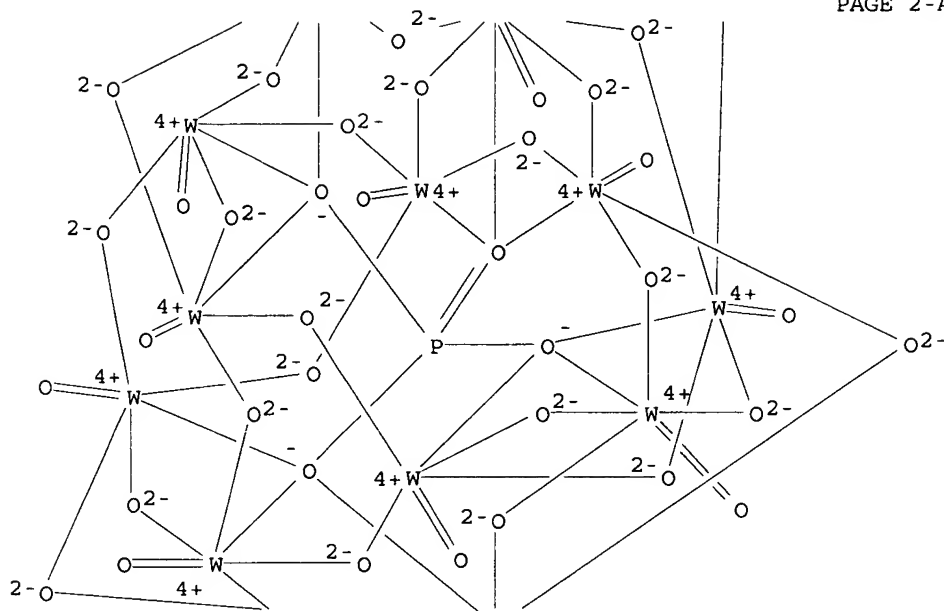
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 12501-23-4 HCAPLUS
 CN Tungstate(3-), tetracos-μ-oxododeca-oxo[μ12-[phosphato(3-)-
 O:O:O:O':O':O':O':O':O':O':O':O':O']dodeca-, trihydrogen,
 hydrate (9CI) (CA INDEX NAME)

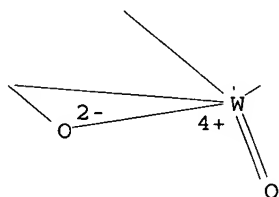
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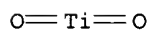
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● 3 H⁺● x H₂O

RN 13463-67-7 HCAPLUS
 CN Titanium oxide (TiO₂) (8CI, 9CI) (CA INDEX NAME)



RN 39290-95-4 HCAPLUS
 CN Tungsten zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	x	17778-80-2
Zr	x	7440-67-7
W	x	7440-33-7

RN 84973-55-7 HCAPLUS
 CN Tungstate(6-), hexatriaconta-μ-oxooctadeca-oxobis[μ9-
 [phosphato(3-)-κO:κO:κO:κO':κO':.kap
 pa.O':κO':κO':κO':κO':]]octadeca-,
 hexahydrogen, hydrate (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT 7440-18-8, Ruthenium, uses
 RL: CAT (Catalyst use); USES (Uses)
 (preparation of mercaptans by hydrogen
 sulfide-cleavage of thioether in
 the presence of H₂, and a catalyst composition, in
 particular heteropolyacids/Pd/SiO₂)
 RN 7440-18-8 HCAPLUS
 CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Ru

IT 7783-06-4, Hydrogen sulfide, reactions
 RL: RCT (Reactant); RGT (Reagent); RACT (Reactant or reagent)
 (preparation of mercaptans by hydrogen
 sulfide-cleavage of thioether in
 the presence of H₂, and a catalyst composition, in
 particular heteropolyacids/Pd/SiO₂)
 RN 7783-06-4 HCAPLUS
 CN Hydrogen sulfide (H₂S) (8CI, 9CI) (CA INDEX NAME)

H₂S

IT 1333-74-0, Hydrogen, reactions
 RL: RGT (Reagent); RACT (Reactant or reagent)
 (preparation of mercaptans by hydrogen
 sulfide-cleavage of thioether in
 the presence of H₂, and a catalyst composition, in
 particular heteropolyacids/Pd/SiO₂)
 RN 1333-74-0 HCAPLUS
 CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IC ICM B01J027-182
 ICS B01J027-186; B01J023-30; B01J021-18; C07C319-04
 CC 23-7 (Aliphatic Compounds)
 Section cross-reference(s): 45, 67
 ST mercaptan prepn thioether
 hydrogen sulfide cleavage
 heteropolyacid; silica supported
 heteropolyacid palladium mercaptan prepn
 thioether cleavage hydrogen
 IT Group VIII elements
 Heteropoly acids
 RL: CAT (Catalyst use); USES (Uses)
 (catalyst composition; preparation of
 mercaptans by hydrogen sulfide-
 cleavage of thioether in the presence of H₂,
 and a catalyst composition, in particular
 heteropolyacids/Pd/SiO₂)
 IT Catalysts
 (catalytic composition component; preparation of

- mercaptans by hydrogen sulfide-cleavage of thioether in the presence of H₂, and a catalyst composition, in particular heteropolyacids/Pd/SiO₂)
- IT Zeolites (synthetic), uses
 RL: CAT (Catalyst use); USES (Uses)
 (catalytic composition component; preparation of mercaptans by hydrogen sulfide-cleavage of thioether in the presence of H₂, and a catalyst composition, in particular heteropolyacids/Pd/SiO₂)
- IT Resins
 RL: CAT (Catalyst use); USES (Uses)
 (cationic; catalyst composition component; preparation of mercaptans by hydrogen sulfide-cleavage of thioether in the presence of H₂, and a catalyst composition, in particular heteropolyacids/Pd/SiO₂)
- IT Bond cleavage
 Bond cleavage catalysts
 Catalysis
 Solid phase synthesis
 (preparation of mercaptans by hydrogen sulfide-cleavage of thioether in the presence of H₂, and a catalyst composition, in particular heteropolyacids/Pd/SiO₂)
- IT Thiols, preparation
 RL: IMF (Industrial manufacture); PREP (Preparation)
 (products; preparation of mercaptans by hydrogen sulfide-cleavage of thioether in the presence of H₂, and a catalyst composition, in particular heteropolyacids/Pd/SiO₂)
- IT Thioethers
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (starting materials; preparation of mercaptans by hydrogen sulfide-cleavage of thioether in the presence of H₂, and a catalyst composition, in particular heteropolyacids/Pd/SiO₂)
- IT 7647-10-1, Palladium chloride
 RL: RGT (Reagent); RACT (Reactant or reagent)
 (catalyst precursor; preparation of mercaptans by hydrogen sulfide-cleavage of thioether in the presence of H₂, and a catalyst composition, in particular heteropolyacids/Pd/SiO₂)
- IT 1314-23-4, Zirconium dioxide, uses
 1343-93-7D, potassium, rubidium, cesium, ammonium salts
 1344-28-1, Alumina, uses 7439-88-5, Iridium, uses 7440-02-0, Nickel, uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses 7440-44-0, Carbon, uses 7440-48-4, Cobalt, uses 7631-86-9, Silica, uses 12027-38-2D, potassium, rubidium, cesium, ammonium salts 12027-43-9
 12411-74-4D, potassium, rubidium, cesium, ammonium salts
 12501-23-4 13463-67-7, Titanium dioxide, uses 14644-61-2 39290-95-4, Zirconium tungstate 84973-55-7
 RL: CAT (Catalyst use); USES (Uses)
 (catalytic composition component; preparation of mercaptans by hydrogen sulfide-

cleavage of thioether in the presence of H₂,
and a catalyst composition, in particular
heteropolyacids/Pd/SiO₂)

IT 75-08-1P, Ethyl mercaptan
RL: IMF (Industrial manufacture); PREP (Preparation)
(mercaptan product; preparation of
mercaptans by hydrogen sulfide-
cleavage of thioether in the presence of H₂,
and a catalyst composition, in particular
heteropolyacids/Pd/SiO₂)

IT 7440-18-8, Ruthenium, uses
RL: CAT (Catalyst use); USES (Uses)
(preparation of mercaptans by hydrogen
sulfide-cleavage of thioether in
the presence of H₂, and a catalyst composition, in
particular heteropolyacids/Pd/SiO₂)

IT 7783-06-4, Hydrogen sulfide, reactions
RL: RCT (Reactant); RGT (Reagent); RACT (Reactant or reagent)
(preparation of mercaptans by hydrogen
sulfide-cleavage of thioether in
the presence of H₂, and a catalyst composition, in
particular heteropolyacids/Pd/SiO₂)

IT 1333-74-0, Hydrogen, reactions
RL: RGT (Reagent); RACT (Reactant or reagent)
(preparation of mercaptans by hydrogen
sulfide-cleavage of thioether in
the presence of H₂, and a catalyst composition, in
particular heteropolyacids/Pd/SiO₂)

IT 352-93-2, Diethylsulfide
RL: RCT (Reactant); RACT (Reactant or reagent)
(starting material; preparation of mercaptans by
hydrogen sulfide-cleavage of
thioether in the presence of H₂, and a catalyst
composition, in particular heteropolyacids/Pd/SiO₂
)

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L143 ANSWER 3 OF 3 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1996:181632 HCAPLUS

DOCUMENT NUMBER: 124:203320

TITLE: Preparation of bisphenol A in presence of a
polysiloxane catalyst and preparation of the
catalyst

INVENTOR(S): Inoue, Kaoru; Ohkubo, Tuneyuki; Terajima,
Takashi

PATENT ASSIGNEE(S): Mitsui Toatsu Chemicals, Inc., Japan

SOURCE: Eur. Pat. Appl., 23 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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EP 693470	A1	19960124	EP 1995-111437	1995 0720
EP 693470	B1	19980520		
R: DE, GB, NL				
JP 08208545	A2	19960813	JP 1995-141828	1995 0608

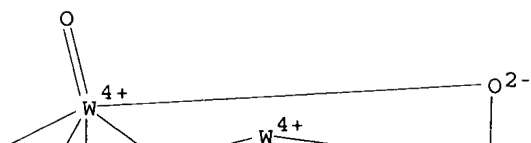
AB Bisphenol A is prepared with a high conversion and selectivity by reacting PhOH with acetone in the presence of a polyorganosiloxane having a mercapto group-containing hydrocarbon group, and an acid, preferably as a sulfonic acid group on the polyorganosiloxane. The preferred polyorganosiloxane is prepared by hydrolyzing ≥ 1 silane $XnSiR_4-n$ ($R = C_1-20$ hydrocarbyl having ≥ 1 SH, C_1-15 alkyl having ≥ 1 halogen, C_2-15 olefinic hydrocarbyl, C_2-15 epoxy-containing hydrocarbyl; $X = Cl, Br, I, \text{alkoxy}$; $n = 1-3$), sulfonating the R group, silylating with ≥ 1 silane $XnSi(R_1)_4-n$ ($R_1 = C_1-20$ hydrocarbon having ≥ 1 SH; X and n as above), and hydrolyzing. Thus, 1.90 g acetone and 33.00 g PhOH were reacted in the presence of 2.00 g dodecatungstophosphoric acid (2/3 of protons exchanged with ammonium cations) and 0.06 g catalyst prepared from 10.0 g each of $Si(OEt)_4$ and $(HSCH_2CH_2CH_2)Si(OMe)_3$, to give bisphenol A in 87.6% yield.

IT 1343-93-7 12027-38-2
RL: CAT (Catalyst use); USES (Uses)
(catalyst; preparation of bisphenol A in presence of a polysiloxane catalyst and preparation of the catalyst)

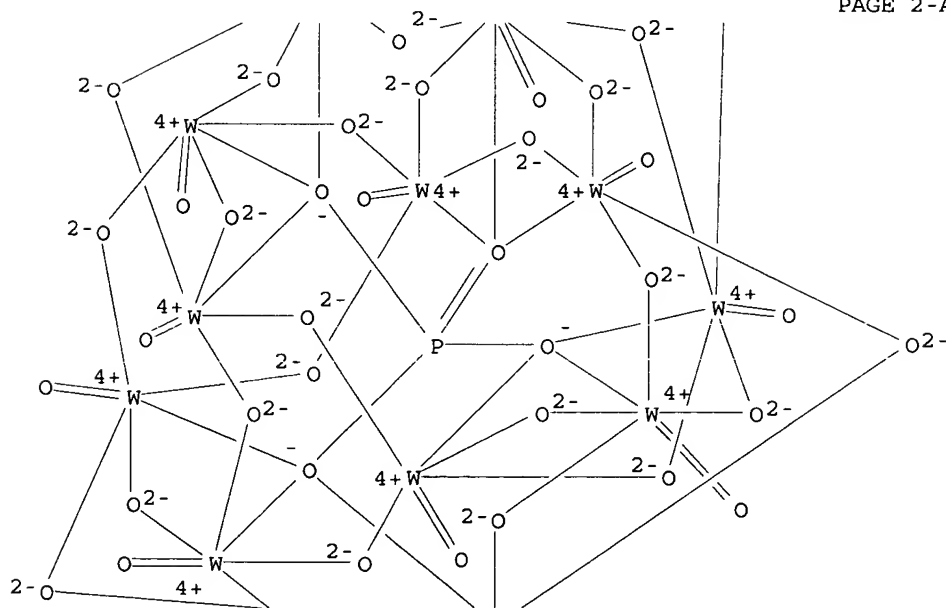
RN 1343-93-7 HCAPLUS

CN Tungstate(3-), tetracosam- μ -oxododecaoxo [μ_{12} -[phosphato(3-)-
:K:O':K:O':K:O':K:O':K:O']dodeca-
a-, trihydrogen (9CI) (CA INDEX NAME)

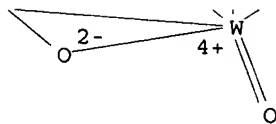
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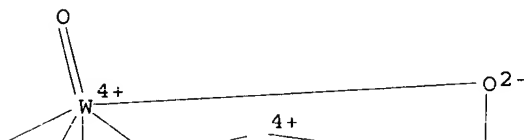


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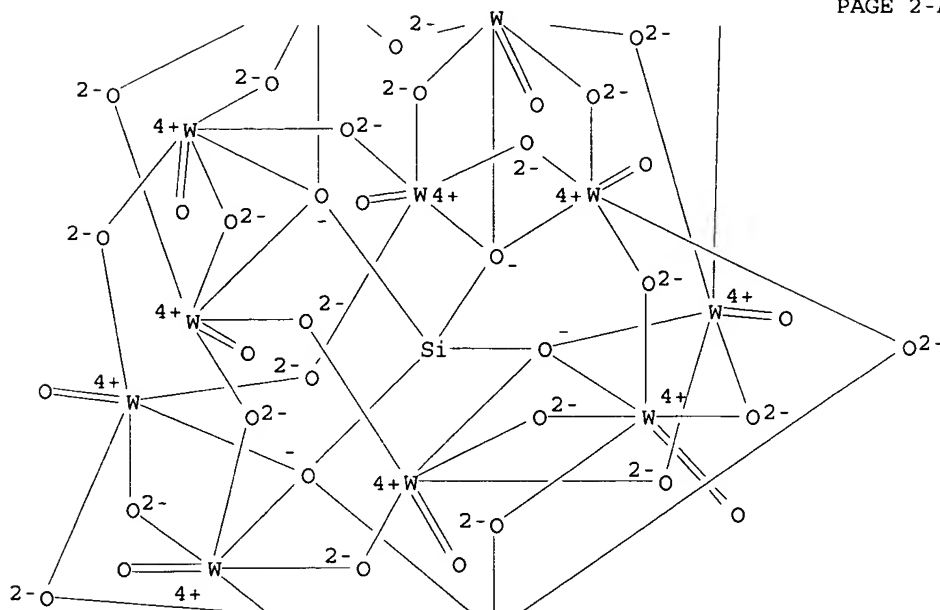
● 3 H⁺

RN 12027-38-2 HCAPLUS
 CN Tungstate(4-), [μ12-[orthosilicato(4-)-
 κO:κO:κO:κO':κO':κO':κO'
 ':κO':κO':κO':κO':κO':κO']tetra
 cosa-μ-oxododecaoxododeca-, tetrahydrogen (9CI) (CA INDEX
 NAME)

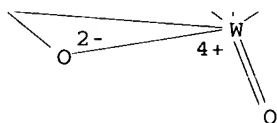
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PAGE 3-A

● 4 H⁺

- IC ICM C07C037-20
ICS C08G077-392
- CC 35-3 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 25
- ST bisphenol A **prepn** polyorganosiloxane catalyst; phenol
acetone reaction polyorganosiloxane catalyst; acid
mercaptosiloxane cocatalyst condensation; ammonium
dodecatungstophosphate catalyst; tetraethoxysilane
mercaptopropyltrimethoxysilane catalyst
- IT Siloxanes and Silicones, uses
RL: CAT (Catalyst use); USES (Uses)
(**mercapto**, **preparation** of bisphenol A in
presence of a polysiloxane catalyst and **preparation** of the
catalyst)
- IT 1343-93-7 7647-01-0, Hydrochloric acid, uses
9003-70-7D, Divinylbenzene-styrene copolymer, sulfonated
9037-24-5, Amberlyst 15 12026-88-9 12026-92-5
12027-38-2
RL: CAT (Catalyst use); USES (Uses)
(catalyst; preparation of bisphenol A in presence of a polysiloxane
catalyst and preparation of the catalyst)
- IT 78-08-0, Vinyltriethoxysilane 78-10-4, Tetraethoxysilane
780-69-8, Phenyltriethoxysilane 998-30-1, Triethoxysilane
1561-92-8, Sodium methallyl sulfonate 2495-39-8, Sodium allyl

sulfonate 2530-83-8, 3-Glycidoxypentyltrimethoxysilane
 3039-83-6, Sodium vinyl sulfonate 4420-74-0, 3-
Mercaptopropyltrimethoxysilane 7631-90-5, Sodium
 bisulfite 7664-93-9, Sulfuric acid, uses 7697-37-2, Nitric
 acid, uses 7757-83-7, Sodium sulfite 18143-56-1 25512-39-4,
 Chloropropyltrimethoxysilane 27457-28-9, Sodium styrene
 sulfonate 31001-77-1, 3-Mercaptopropyltrimethoxymethylsilane

RL: CAT (Catalyst use); USES (Uses)

(catalysts from; **preparation** of bisphenol A in presence of
 a polysiloxane catalyst and **preparation** of the catalyst)

=> => d que stat l144

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 1314-23-4/BI OR 1333-74-0/BI OR 1343-93-7/BI OR
 1344-28-1/BI OR 13463-67-7/BI OR 14644-61-2/BI OR
 352-93-2/BI OR 39290-95-4/BI OR 7439-88-5/BI OR
 7440-02-0/BI OR 7440-04-2/BI OR 7440-05-3/BI OR
 7440-06-4/BI OR 7440-16-6/BI OR 7440-18-8/BI OR
 7440-44-0/BI OR 7440-48-4/BI OR 75-08-1/BI OR 7631-86-9
 /BI OR 7647-10-1/BI OR 7783-06-4/BI OR 84973-55-7/BI)
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 L5 1 SEA FILE=REGISTRY ABB=ON PLU=ON 1333-74-0/RN
 L6 129 SEA FILE=REGISTRY ABB=ON PLU=ON (H(L)O(L)P(L)W)/ELS(L
)4/ELC.SUB
 L7 58 SEA FILE=REGISTRY ABB=ON PLU=ON L6 AND H2O
 L9 45 SEA FILE=REGISTRY ABB=ON PLU=ON L7 AND O40PW12
 L11 72 SEA FILE=REGISTRY ABB=ON PLU=ON (H(L)O(L)SI(L)W)/ELS(
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 L13 51 SEA FILE=REGISTRY ABB=ON PLU=ON L11 AND O40SIW12
 L14 36 SEA FILE=REGISTRY ABB=ON PLU=ON L13 AND H2O
 L15 1 SEA FILE=REGISTRY ABB=ON PLU=ON 1314-23-4/RN
 L17 1 SEA FILE=REGISTRY ABB=ON PLU=ON 7631-86-9/RN
 L18 42 SEA FILE=REGISTRY ABB=ON PLU=ON (S(L)O(L)ZR)/ELS(L)3/
 ELC.SUB
 L19 14 SEA FILE=REGISTRY ABB=ON PLU=ON L18 AND O4S
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 L24 146017 SEA FILE=HCAPLUS ABB=ON PLU=ON MERCAPT?
 L25 14375 SEA FILE=HCAPLUS ABB=ON PLU=ON THIOETHER OR THIO(A)ET
 HER
 L26 114741 SEA FILE=HCAPLUS ABB=ON PLU=ON L4 OR (HYDROGEN OR H2
 OR H) (A) (SULPHIDE OR SULFIDE OR S) OR H2S
 L27 1006379 SEA FILE=HCAPLUS ABB=ON PLU=ON L3
 L28 19 SEA FILE=HCAPLUS ABB=ON PLU=ON L25 AND L26 AND L27
 L29 QUE ABB=ON PLU=ON STRONG? (A)ACID?
 L30 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L29 AND L28
 L31 1588885 SEA FILE=HCAPLUS ABB=ON PLU=ON CATALY? OR ACTIVATOR?
 OR ACCELERANT? OR ENHANCER? OR ACCELERAT!R?
 L32 13 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L31
 L33 8446 SEA FILE=HCAPLUS ABB=ON PLU=ON L23 (L) PREP?
 L34 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L33 AND L28
 L35 8 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND ACID?
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 AND L27
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 L42 1467 SEA FILE=HCAPLUS ABB=ON PLU=ON L12
 L43 1468 SEA FILE=HCAPLUS ABB=ON PLU=ON LL41 OR L42

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 L49 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L48 AND L43
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 HETERO (A) POLYACID? OR HETERO (2A) POLY (2A) ACID? OR
 HETEROPOLY (A) ACID?
 L51 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L28
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 L54 162 SEA FILE=HCAPLUS ABB=ON PLU=ON L14
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 L56 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L55
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 L58 1587 SEA FILE=HCAPLUS ABB=ON PLU=ON L11
 L59 3582 SEA FILE=HCAPLUS ABB=ON PLU=ON L57 OR L58
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 L70 1 SEA FILE=REGISTRY ABB=ON PLU=ON AMMONIUM/CN
 L71 QUE ABB=ON PLU=ON L66 OR POTASSIUM
 L72 QUE ABB=ON PLU=ON L67 OR RUBIDIUM OR L68
 L73 QUE ABB=ON PLU=ON L69 OR CESIUM
 L74 QUE ABB=ON PLU=ON L70 OR AMMONIUM
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 L77 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L26 AND L27 AND L76
 L78 215241 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L71 OR L72 OR L73
 OR L74) OR K OR RB OR CS OR NH4) (2A) (SALT? OR CATION
 OR ION OR X OR HALOGEN)
 L79 235 SEA FILE=HCAPLUS ABB=ON PLU=ON L78 AND L59
 L80 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L79 AND ((L23 OR L24
 OR L25))
 L81 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L80 AND L26 AND L27
 L82 92912 SEA FILE=HCAPLUS ABB=ON PLU=ON L15
 L83 90 SEA FILE=HCAPLUS ABB=ON PLU=ON L19
 L84 205 SEA FILE=HCAPLUS ABB=ON PLU=ON L18
 L85 377 SEA FILE=HCAPLUS ABB=ON PLU=ON L20
 L87 2 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L82 OR L83 OR L84
 OR L85)) AND L28
 L88 23 SEA FILE=HCAPLUS ABB=ON PLU=ON L59 AND L26
 L89 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L88 AND L27
 L90 118887 SEA FILE=HCAPLUS ABB=ON PLU=ON ZEOLIT?
 L91 48578 SEA FILE=HCAPLUS ABB=ON PLU=ON CATION? (2A) (RESIN? OR
 POLYM? OR HOMOPOLY? OR COPOLYM? OR (CO OR TER) (W) POLYM?
 OR TERPOLYM?)
 L92 152 SEA FILE=HCAPLUS ABB=ON PLU=ON (L75 OR L59 OR L79)
 AND ((L82 OR L83 OR L84 OR L85))
 L93 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L92 AND L90 AND L91
 L94 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L92 AND L26 AND (L24
 OR L25)
 L95 23 SEA FILE=HCAPLUS ABB=ON PLU=ON L30 OR L32 OR (L34 OR
 L35) OR L37 OR L39 OR (L44 OR L45) OR L49 OR (L51 OR
 L52) OR L56 OR L60 OR (L76 OR L77) OR (L80 OR L81) OR
 L87 OR L89 OR L93 OR L94
 L96 46 SEA FILE=HCAPLUS ABB=ON PLU=ON L95 OR L40

L97 QUE ABB=ON PLU=ON L17 OR SILICA OR SIO2 OR(SILICON
 OR SI) (A) (DIOXIDE OR OXIDE OR O2)
 L98 QUE ABB=ON PLU=ON L61 OR ALUMINA OR AL2O3 OR (ALUMIN
 UM OR ALUMINIUM OR AL) (A) (OXIDE OR O3)
 L99 18 SEA FILE=REGISTRY ABB=ON PLU=ON O2TI/MF
 L100 1 SEA FILE=REGISTRY ABB=ON PLU=ON ACTIVATED CARBON/CN
 L101 QUE ABB=ON PLU=ON L99 OR (TITANIUM OR TI) (A) (DIOXIDE
 OR OXIDE OR O2) OR TIO2
 L102 QUE ABB=ON PLU=ON L82 OR ZIRCONIA OR (ZIRCONIUM OR Z
 R) (A) (DIOXIDE OR O2 OR OXIDE) OR ZRO2
 L103 QUE ABB=ON PLU=ON (L100 OR CARBON OR C OR CHARCOAL) (A) ACTIVAT?
 L104 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 AND ((L97 OR L98)
 OR (L101 OR L102 OR L103))
 L105 46 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 OR L104
 L106 28 SEA FILE=HCAPLUS ABB=ON PLU=ON L105 AND (L33 OR L46)

 L107 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L106
 L108 QUE ABB=ON PLU=ON L5 OR (HYDROGEN OR H2) (A) (ELEMENT?
 OR GAS? OR FEED? OR REACT?)
 L109 358 SEA FILE=HCAPLUS ABB=ON PLU=ON L108 AND L26 AND (L24
 OR L25)
 L110 9 SEA FILE=HCAPLUS ABB=ON PLU=ON L105 AND L109
 L111 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L105 AND CLEAV?
 L112 QUE ABB=ON PLU=ON (L105 OR L106 OR L107) OR L110 OR
 L111
 L113 7 SEA FILE=HCAPLUS ABB=ON PLU=ON L112 AND 23/SC,SX
 L114 10 SEA FILE=HCAPLUS ABB=ON PLU=ON L112 AND 45/SC,SX
 L115 9 SEA FILE=HCAPLUS ABB=ON PLU=ON L112 AND 67/SC,SX
 L116 18 SEA FILE=HCAPLUS ABB=ON PLU=ON (L113 OR L114 OR
 L115)
 L117 4 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L108
 L118 28 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L112 OR L113 OR
 L114 OR L115 OR L116 OR L117)) AND L46
 L119 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L118 AND L108 AND L26
 AND L27
 L120 27252 SEA FILE=HCAPLUS ABB=ON PLU=ON L24 (3A) (PRODUC? OR
 PROD# OR GENERAT? OR MANUF? OR MFR# OR CREAT? OR
 FORM## OR FORMING# OR FORMAT? OR MAKE# OR MADE# OR
 MAKIN# OR FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)
 L121 11 SEA FILE=HCAPLUS ABB=ON PLU=ON L120 AND L118
 L122 26589 SEA FILE=HCAPLUS ABB=ON PLU=ON ?MERCAP? (2A) (PRODUC?
 OR PROD# OR GENERAT? OR MANUF? OR MFR# OR CREAT? OR
 FORM## OR FORMING# OR FORMAT? OR MAKE# OR MADE# OR
 MAKIN# OR FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)
 L123 11 SEA FILE=HCAPLUS ABB=ON PLU=ON L122 AND (L121 OR
 L105)
 L124 32494 SEA FILE=HCAPLUS ABB=ON PLU=ON ?THIOL? (2A) (PRODUC?
 OR PROD# OR GENERAT? OR MANUF? OR MFR# OR CREAT? OR
 FORM## OR FORMING# OR FORMAT? OR MAKE# OR MADE# OR
 MAKIN# OR FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)
 L125 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L124 AND L105
 L126 19 SEA FILE=HCAPLUS ABB=ON PLU=ON L117 OR L119 OR L121
 OR L123 OR L125
 L127 QUE ABB=ON PLU=ON 6/SC,SX
 L128 QUE ABB=ON PLU=ON 59/SC,SX
 L129 17 SEA FILE=HCAPLUS ABB=ON PLU=ON L126 NOT (L127 OR
 L128)
 L130 15 SEA FILE=HCAPLUS ABB=ON PLU=ON L129 NOT FUEL?/SC,SX
 L131 15 SEA FILE=HCAPLUS ABB=ON PLU=ON L130 AND (L96 OR
 (L104 OR L105 OR L106 OR L107) OR (L110 OR L111 OR
 L112 OR L113 OR L114 OR L115 OR L116 OR L117 OR L118
 OR L119) OR L121 OR L123 OR L125 OR L126 OR L129)
 L132 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L131 AND L59
 L133 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L131 AND L50
 L134 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L132 OR L133

L135 2413 SEA FILE=HCAPLUS ABB=ON PLU=ON L62
 L136 1375 SEA FILE=HCAPLUS ABB=ON PLU=ON L63
 L137 97 SEA FILE=HCAPLUS ABB=ON PLU=ON L64
 L138 115 SEA FILE=HCAPLUS ABB=ON PLU=ON L65
 L139 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L131 AND ((L135 OR
 L136 OR L137 OR L138))
 L140 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L55 AND L131
 L141 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L55 AND L105
 L142 3 SEA FILE=HCAPLUS ABB=ON PLU=ON (L139 OR L140 OR
 L141)
 L143 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L142 AND L134
 L144 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L131 NOT L143

=> d l144 1-12 ibib abs hitstr hitind

L144 ANSWER 1 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:402973 HCAPLUS

DOCUMENT NUMBER: 145:64832

TITLE: Iron Modified MCM-41 Materials Characterized
by Methanol Oxidation and Sulphurization
Reactions

AUTHOR(S): Trejda, M.; Kujawa, J.; Ziolek, M.

CORPORATE SOURCE: Faculty of Chemistry, A. Mickiewicz
University, Poznan, PL-60-780, Pol.

SOURCE: Catalysis Letters (2006), 108(3-4), 141-146
CODEN: CALBER; ISSN: 1011-372X

PUBLISHER: Springer

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The zeolites SiMCM-41, AlMCM-41, NbMCM-41 were used as supports
for iron **catalyst** species introduced by wet impregnation
and chemical vapor deposition (CVD) methods. Methanol oxidation and
sulfurization were used for characterization of **catalytic**
properties. The support nature and the type of iron species have
no effect on the selectivity of methanol oxidation. However, they
bear a significant influence on both the activity and selectivity
in the reaction between methanol and **hydrogen**
sulfide. The wet impregnation of NbMCM-41 and AlMCM-41
with Fe(NO₃)₃ leads to the most effective **catalysts** in
the sulfurization of methanol.

IT 7439-89-6, Iron, uses

RL: CAT (Catalyst use); USES (Uses)

(preparation and activity of iron/metal MCM-41 **catalysts**
in methanol oxidation and sulfurization reactions)

RN 7439-89-6 HCAPLUS

CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and
Waxes)

Section cross-reference(s): 67

ST iron **catalyst** metal MCM41 support prepn activity
methanol oxidn; sulfurization methanol **hydrogen**
sulfide iron metal zeolite **catalyst**

IT **Catalyst** supports

(metal MCM-41; preparation and activity of iron/metal MCM-41
catalysts in methanol oxidation and sulfurization
reactions)

IT Oxidation **catalysts**

Sulfidation **catalysts**

(preparation and activity of iron/metal MCM-41 **catalysts**
in methanol oxidation and sulfurization reactions)

IT Zeolite MCM-41
RL: CAT (Catalyst use); USES (Uses)
(support; preparation and activity of iron/metal MCM-41
catalysts in methanol oxidation and sulfurization
reactions)

IT 74-82-8P, Methane, preparation 75-18-3P, Dimethyl
thioether 115-10-6P, Dimethyl ether
RL: BYP (Byproduct); PREP (Preparation)
(preparation and activity of iron/metal MCM-41 catalysts
in methanol oxidation and sulfurization reactions)

IT 7439-89-6, Iron, uses
RL: CAT (Catalyst use); USES (Uses)
(preparation and activity of iron/metal MCM-41 catalysts
in methanol oxidation and sulfurization reactions)

IT 74-93-1P, Methanethiol, preparation
107-31-3P, Methyl formate
RL: IMF (Industrial manufacture); PREP (Preparation)
(preparation and activity of iron/metal MCM-41
catalysts in methanol oxidation and sulfurization
reactions)

IT 67-56-1, Methanol, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(preparation and activity of iron/metal MCM-41 catalysts
in methanol oxidation and sulfurization reactions)

IT 7440-03-1, Niobium, uses
RL: CAT (Catalyst use); USES (Uses)
(zeolite containing, support; preparation and activity of iron/metal
MCM-41 catalysts in methanol oxidation and sulfurization
reactions)

REFERENCE COUNT: 23 THERE ARE 23 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L144 ANSWER 2 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2006:209715 HCAPLUS
DOCUMENT NUMBER: 144:292126
TITLE: Methods, compositions, and apparatuses for
forming macrocyclic compounds
INVENTOR(S): Johnson, Thomas E.; Fowler, Billy T.
PATENT ASSIGNEE(S): USA
SOURCE: PCT Int. Appl., 85 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2006025859	A2	20060309	WO 2005-US5028	

2005
0217

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,
CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG,
ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP,
KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL,
PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR,
HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK,
TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE,
SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ,
TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

PRIORITY APPLN. INFO.: US 2004-545131P P

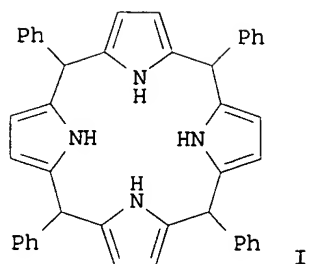
2004
0217

US 2005-59796

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2005
0217

GI



AB The invention is related to a process for manufacturing of at least one macrocyclic compound, e.g. tetraphenylporphyrin I, by (a) providing a reaction system comprising one or more reactants in a reaction medium, which are capable of forming the macrocycle through a desired reaction pathway that includes at least cyclization reaction(s), and which are further capable of forming undesired oligomers through at least one undesired reaction pathway that includes undesirable oligomerization reactions; and (b) modulating oligomerization reactions in the reaction medium, so as to reduce formation of the undesired oligomers and/or to reduce separation of the undesired oligomers from the reaction medium, relative to corresponding unmodulated oligomerization reactions. Oligomerization control additives are claimed. Cyclization solvents, and solvents that assist with spontaneous separation of the macrocycle from the reaction medium, are also claimed. Reaction of benzaldehyde with pyrrole in a reaction composition that contained about 37.5% by volume MeOH (precipitating solvent), 62.5% by volume H₂O (oligomerization control additive), and 0.014 g/mL NaCl (separation additive) gave tetraphenylporphyrin I, in about 85% yield, compared to less than 1% in the absence of any oligomerization control. Prophetic examples of addnl. potential macrocyclic compds., e.g. porphyrins, macrocyclic imines, aryl boronates, crown ethers, cyclic peptides, etc., are also given and claimed.

IT **7783-06-4P**, Dihydrogen sulfide, preparation
RL: BYP (Byproduct); NUU (Other use, unclassified); RGT (Reagent);
PREP (Preparation); RACT (Reactant or reagent); USES (Uses)
(oligomerization control additive; preparation of macrocyclic compds. via macrocyclization by modulating oligomerization reactions in the reaction medium)

RN 7783-06-4 HCAPLUS

CN Hydrogen sulfide (H₂S) (8CI, 9CI) (CA INDEX NAME)

H₂S

IT **1333-74-0P**, Hydrogen, preparation
RL: BYP (Byproduct); RGT (Reagent); PREP (Preparation); RACT
(Reactant or reagent)
(oligomerization control additive; preparation of macrocyclic compds. via macrocyclization by modulating oligomerization reactions in the reaction medium)

reactions in the reaction medium)
RN 1333-74-0 HCAPLUS
CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 20074-52-6D, salts, uses
RL: NUU (Other use, unclassified); USES (Uses)
(use of separation additives, particularly salts, for spontaneous
separation of the macrocycle from the reaction medium)
RN 20074-52-6 HCAPLUS
CN Iron, ion (Fe3+) (8CI, 9CI) (CA INDEX NAME)

Fe3+

CC 21-2 (General Organic Chemistry)
Section cross-reference(s): 26, 28, 29, 34, 45
IT Sulfones
RL: IMF (Industrial manufacture); PREP (Preparation)
(aryl, macrocyclic aromatic **thioether** sulfone products;
preparation of macrocyclic compds. via macro/cyclization by
modulating oligomerization reactions in the reaction medium)
IT **Acids, preparation**
Group IIIA element compounds
RL: BYP (Byproduct); IMF (Industrial manufacture); RCT (Reactant);
RGT (Reagent); PREP (Preparation); RACT (Reactant or reagent)
(boronic **acids**; preparation of macrocyclic compds. via
macrocyclization by modulating oligomerization reactions in the
reaction medium)
IT Carboxylic **acids, reactions**
RL: RCT (Reactant); RACT (Reactant or reagent)
(containing ether terminal groups; precursors for macrocyclic
lactone; preparation of macrocyclic compds. via macro/cyclization by
modulating oligomerization reactions in the reaction medium)
IT Carboxylic **acids, reactions**
RL: RCT (Reactant); RACT (Reactant or reagent)
(dicarboxylic, precursors for macrocyclic dibutyltin
dicarboxylate; preparation of macrocyclic compds. via
macro/cyclization by modulating oligomerization reactions in
the reaction medium)
IT Alkyl halides
Amino **acids, preparation**
Bromides, preparation
Disulfides
Elements
Inorganic compounds
Organic compounds, preparation
Organometallic compounds
Peroxides, preparation
Radicals, preparation
Silanes
Sulfates, preparation
Sulfenic **acids**
Sulfinic **acids**
Sulfones
Sulfoxides
Thiols, preparation
RL: BYP (Byproduct); RGT (Reagent); PREP (Preparation); RACT
(Reactant or reagent)
(oligomerization control additives; preparation of macrocyclic
compds. via macrocyclization by modulating oligomerization
reactions in the reaction medium)

- IT Peptides, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (peptides flanked with **thioether** and thiol terminal groups; precursors for macrocyclic cyclic peptides; preparation of macrocyclic compds. via macro/cyclization by modulating oligomerization reactions in the reaction medium)
- IT Sulfonic acids, preparation
 RL: BYP (Byproduct); CAT (Catalyst use); RGT (Reagent); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)
 (preparation of macrocyclic compds. via macrocyclization by modulating oligomerization reactions in the reaction medium)
- IT Aromatic compounds
 RL: IMF (Industrial manufacture); PREP (Preparation)
 (sulfones, macrocyclic aromatic **thioether** sulfone products; preparation of macrocyclic compds. via macro/cyclization by modulating oligomerization reactions in the reaction medium)
- IT Rare earth metals, uses
 RL: CAT (Catalyst use); USES (Uses)
 (triflates; use of Lewis acids as cyclization catalyst in the preparation of porphyrinogens)
- IT 97-94-9, Triethylboron 109-63-7, Boron trifluoride etherate 373-57-9 7446-70-0, Aluminum chloride (AlCl₃), uses 7647-17-8, Cesium chloride (CsCl), uses 7784-18-1, Aluminum fluoride (AlF₃) 7788-97-8, Chromium fluoride (CrF₃) 10025-82-8, Indium chloride (InCl₃) 10038-98-9, Germanium chloride (GeCl₄) 10099-58-8, Lanthanum chloride (LaCl₃) 13465-55-9 19423-80-4, Europium trichloride hydrate 144026-79-9, Scandium triflate
 RL: CAT (Catalyst use); USES (Uses)
 (catalyst; use of Lewis acids as cyclization catalyst in the preparation of porphyrinogens)
- IT 65-85-0, Benzoic acid, uses 75-75-2, Methanesulfonic acid 76-03-9, Trichloroacetic acid, uses 76-05-1, Trifluoroacetic acid, uses 79-09-4, Propionic acid, uses 98-11-3, Benzenesulfonic acid, uses 104-15-4, p-Toluenesulfonic acid, uses 1493-13-6, Triflic acid 3144-16-9, Camphor sulfonic acid
 RL: CAT (Catalyst use); USES (Uses)
 (catalyst; use of protic acids as cyclization catalyst in the preparation of porphyrinogens)
- IT 50-00-0, Formol, uses 57-55-6, Propylene glycol, uses 60-29-7, Ethyl ether, uses 64-18-6, Formic acid, uses 67-63-0, Isopropanol, uses 67-66-3, Chloroform, uses 67-68-5, Dimethyl sulfoxide, uses 75-15-0, Carbon disulfide, uses 75-52-5, Nitromethane, uses 75-65-0, tert-Butanol, uses 78-83-1, Isobutanol, uses 78-93-3, Methyl ethyl ketone, uses 97-99-4 100-79-8, Solketal 107-21-1, Ethylene glycol, uses 108-88-3, Toluene, uses 109-86-4, Methyl cellosolve 109-99-9, Tetrahydrofuran, uses 110-71-4, Monoglyme 110-71-4D, Glyme, derivs. 110-80-5, Cellosolve 111-46-6, Diethylene glycol, uses 111-77-3, Methyl carbitol 111-90-0, Carbitol 111-96-6, Diglyme 112-25-4, Hexyl cellosolve 112-34-5, Butyl carbitol 112-35-6 112-36-7, Ethyl diglyme 112-49-2, Triglyme 112-50-5, Ethoxytriglycol 112-59-4, Hexyl carbitol 112-73-2, Dibutyl carbitol 123-91-1, 1,4-Dioxane, uses 124-16-3, 1-Butoxyethoxy-2-propanol 126-33-0, Sulfolane 138-86-3, Limonene 141-78-6, Ethyl acetate, uses 143-22-6, Butoxytriglycol 143-24-8, Tetraglyme 540-67-0, Methyl ethyl ether 680-31-9, Hexamethylphosphorictriamide, uses 872-50-4, N-Methyl-2-pyrrolidone, uses 5306-85-4, Dimethyl isosorbide 24800-44-0, Tripropylene glycol 25265-71-8, Dipropylene glycol 25322-68-3, Polyethylene glycol 25322-69-4, Polypropylene glycol 29387-86-8 30136-13-1 31692-85-0, Glycofurol 101063-18-7, Propasol DM 214210-60-3, Propasol M 879096-90-9, Hydrosolv
 RL: NUU (Other use, unclassified); USES (Uses)
 (co-solvent; use of co-solvents for spontaneous separation of the macrocycle from the reaction medium)

- IT 7647-01-0P, Hydrochloric acid, preparation 7664-93-9P, Sulfuric acid, preparation 10035-10-6P, Hydrobromic acid, preparation
 RL: BYP (Byproduct); CAT (Catalyst use); RGT (Reagent); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)
 (oligomerization control additive, **catalyst**; preparation of macrocyclic compds. via macrocyclization by modulating oligomerization reactions in the reaction medium)
- IT 64-19-7P, Acetic acid, preparation
 RL: BYP (Byproduct); CAT (Catalyst use); NUU (Other use, unclassified); RGT (Reagent); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)
 (oligomerization control additive; cyclization solvent; **catalyst**; preparation of macrocyclic compds. via macrocyclization by modulating oligomerization reactions in the reaction medium)
- IT 62-53-3P, Aniline, preparation 124-38-9P, Carbon dioxide, preparation **7783-06-4P**, Dihydrogen sulfide, preparation
 RL: BYP (Byproduct); NUU (Other use, unclassified); RGT (Reagent); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)
 (oligomerization control additive; preparation of macrocyclic compds. via macrocyclization by modulating oligomerization reactions in the reaction medium)
- IT 50-21-5P, Lactic acid, preparation 50-99-7P, Glucose, preparation 57-48-7P, Fructose, preparation 58-64-0P, Adenosine diphosphate, preparation 58-97-9P, Uridine 5'-monophosphate, preparation 58-98-0P, Uridine diphosphate, preparation 59-23-4P, Galactose, preparation 61-19-8P, Adenosine 5'-monophosphate, preparation 63-37-6P, Cytidine 5'-monophosphate 63-38-7P, Cytidine diphosphate 74-85-1P, Ethylene, preparation 74-90-8P, Hydrogen cyanide, preparation 75-47-8P, Iodoform 75-75-2DP, Methylsulfonic acid, mesylates 85-32-5P, Guanosine 5'-monophosphate 100-51-6P, Benzyl alcohol, preparation 108-98-5P, Thiophenol, preparation 110-86-1P, Pyridine, preparation 123-56-8P, Succinimide 146-91-8P, Guanosine diphosphate 149-91-7P, Gallic acid, preparation 365-07-1P, Thymidine 5'-monophosphate 491-97-4P, Thymidine diphosphate 503-17-3P, 2-Butyne 556-64-9P, Methyl thiocyanate 630-08-0P, Carbon monoxide, preparation **1333-74-0P**, Hydrogen, preparation 1493-13-6DP, Triflic acid, triflates 2466-09-3P, Pyrophosphoric acid 6066-82-6P, N-Hydroxysuccinimide 7446-09-5P, Sulfur dioxide, preparation 7601-90-3P, Perchloric acid, preparation 7664-38-2P, Phosphoric acid, preparation 7727-37-9P, Nitrogen, preparation 7782-77-6P, Nitrous acid 7789-20-0P, Deuterium oxide 10034-85-2P, Hydroiodic acid 13444-71-8P, Periodic acid 77464-05-2P, N,N-Diisopropylurea
 RL: BYP (Byproduct); RGT (Reagent); PREP (Preparation); RACT (Reactant or reagent)
 (oligomerization control additive; preparation of macrocyclic compds. via macrocyclization by modulating oligomerization reactions in the reaction medium)
- IT 37116-97-5D, derivs.
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (precursors for macrocyclic aromatic **thioether** sulfones; preparation of macrocyclic compds. via macro/cyclization by modulating oligomerization reactions in the reaction medium)
- IT 4358-26-3D, salts 12033-49-7D, Nitrogen oxide (NO₃), salts 13948-08-8D, Triphenylmethylum, salts 14100-65-3D, Metaborate (BO₂-), salts 14265-45-3D, Sulfite, salts 14798-03-9D, Ammonium, salts 14808-79-8D, Sulfate, salts 14996-02-2D, Sulfate (HSO₄-), salts 15158-11-9D, Copper(II), salts, uses 16887-00-6D, Chloride, salts 16984-48-8D, Fluoride, salts 17341-25-2D, Sodium cation, salts, uses **20074-52-6D**, salts, uses 20461-54-5D, Iodide, salts 22537-22-0D, Magnesium

cation, salts, uses 23713-49-7D, Zinc cation, salts, uses
24203-36-9D, Potassium cation, salts, uses 24959-67-9D, Bromide,
salts 25215-10-5D, Guanidinium, salts 32589-80-3D,
Tetramethylphosphonium, salts
RL: NUU (Other use, unclassified); USES (Uses)
(use of separation additives, particularly salts, for spontaneous
separation of the macrocycle from the reaction medium)

L144 ANSWER 3 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:258611 HCAPLUS

DOCUMENT NUMBER: 142:317514

TITLE: Acid-catalyzed thiolation process
for the manufacture of
tertiary-dodecyl mercaptan from
dodecenes and hydrogen
sulfide

INVENTOR(S): Faderl, Juergen; Mueller, Christian; Stephan,
Juergen; Steinbrenner, Ulrich; Birkert,
Oliver; Walther, Bernd-Peter; Gmeiner,
Wolfgang; Maas, Heiko; Schaedler, Volker;
Brand, Alexandra

PATENT ASSIGNEE(S): BASF AG, Germany

SOURCE: Ger. Offen., 12 pp.

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 10340252	A1	20050324	DE 2003-10340252	2003 0829
WO 2005030710	A1	20050407	WO 2004-EP7862	2004 0715

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,
CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG,
ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP,
KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL,
PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR,
TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH,
CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU,
MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI,
CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRIORITY APPLN. INFO.: DE 2003-10340252 A

2003
0829

AB A non-odorous tert.-dodecyl mercaptan, suitable as a
chain-transfer agent, is obtained by the acid-catalyzed
addition of hydrogen sulfide to a C12 alkene
mixture containing 10-18% linear dodecane-derived olefins, 25-40%
5-methylundecane-derived olefins, 25-40% 4-ethyldecane-derived
olefins, 2-8% 5,6-dimethyldecane-derived olefins, 5-12%
5-ethyl-6-methylnonane-derived olefins, 1-5% 4,5-diethyloctane-
derived olefins and ≤5% other hydrocarbons.

IT 7783-06-4DP, Hydrogen sulfide,
tertiary-dodecyl mercaptan reaction products
with C12 alkenes

RL: IMF (Industrial manufacture); PRP (Properties); PREP

(Preparation)

(acid-catalyzed thiolation process for the
manufacture of tertiary-dodecyl mercaptan from
 dodecenes and **hydrogen sulfide**)

RN 7783-06-4 HCAPLUS

CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H2S

IT 7440-02-0, Nickel, uses

RL: CAT (Catalyst use); USES (Uses)
 (dimerization **catalyst**)

RN 7440-02-0 HCAPLUS

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

IC ICM C07C321-04

ICS C07C319-04; C07C006-04

CC 37-2 (Plastics Manufacture and Processing)

Section cross-reference(s): 23, 45

ST **thiolation manuf** tertiary dodecyl

mercaptan; chain transfer agent tertiary dodecyl
mercaptan

IT Alkenes, **preparation**

RL: IMF (Industrial manufacture); PRP (Properties); PREP
 (Preparation)

(C12, addition products with **hydrogen sulfide**;
 acid-catalyzed thiolation process for the
manufacture of tertiary-dodecyl mercaptan from
 dodecenes and **hydrogen sulfide**)

IT Addition reaction

Addition reaction **catalysts**

(acid-catalyzed thiolation process for the
manufacture of tertiary-dodecyl mercaptan from
 dodecenes and **hydrogen sulfide**)

IT Acids, uses

RL: CAT (Catalyst use); USES (Uses)

(acid-catalyzed thiolation process for the
manufacture of tertiary-dodecyl mercaptan from
 dodecenes and **hydrogen sulfide**)

IT Chain transfer agents

(tertiary-dodecyl **mercaptan**; acid-catalyzed
 thiolation process for the **manufacture** of tertiary-dodecyl
mercaptan from dodecenes and **hydrogen**
sulfide)

IT **Thiols, preparation**

RL: IMF (Industrial manufacture); PRP (Properties); PREP
 (Preparation)

(tertiary-dodecyl **mercaptans**; acid-catalyzed
 thiolation process for the **manufacture** of tertiary-dodecyl
mercaptan from dodecenes and **hydrogen**
sulfide)

IT 112-40-3DP, Dodecane, alkenes, tertiary-dodecyl mercaptan

reaction **products** with H2S 1632-70-8DP,

5-Methylundecane, alkenes, tertiary-dodecyl mercaptan

reaction **products** with H2S 1636-41-5DP,

4,5-Diethyloctane, alkenes, tertiary-dodecyl mercaptan

reaction **products** with H2S 1636-43-7DP,

5,6-Dimethyldecane, alkenes, tertiary-dodecyl mercaptan

reaction **products** with H2S 1636-44-8DP,

4-Ethyldecane, alkenes, tertiary-dodecyl mercaptan

reaction products with H₂S 7783-06-4DP
 , Hydrogen sulfide, tertiary-dodecyl
 mercaptan reaction products with C₁₂ alkenes
 25103-58-6P, tert-Dodecanethiol 62184-46-7DP, alkenes,
 tertiary-dodecyl mercaptan reaction products
 with H₂S
 RL: IMF (Industrial manufacture); PRP (Properties); PREP
 (Preparation)

(acid-catalyzed thiolation process for the
 manufacture of tertiary-dodecyl mercaptan from
 dodecenes and hydrogen sulfide)

IT 592-41-6DP, Hexene, C₁₂ dimerization products,
 tertiary-dodecyl mercaptan reaction products
 with H₂S

RL: IMF (Industrial manufacture); RCT (Reactant); PREP
 (Preparation); RACT (Reactant or reagent)
 (acid-catalyzed thiolation process for the
 manufacture of tertiary-dodecyl mercaptan from
 dodecenes and hydrogen sulfide)

IT 7440-02-0, Nickel, uses

RL: CAT (Catalyst use); USES (Uses)
 (dimerization catalyst)

L144 ANSWER 4 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:1127159 HCAPLUS

DOCUMENT NUMBER: 142:56819

TITLE: Chemoselective hydrogenation catalysts
 and their use in a process for the removal of
 alkynes and alkadienes from alkenes
 INVENTOR(S): Bergmeister, Joseph J.; Delzer, Gary A.;
 Cheung, Tin-Tack P.

PATENT ASSIGNEE(S): Chevron Phillips Chemical Company CPChem, USA
 SOURCE: U.S. Pat. Appl. Publ., 6 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2004260131	A1	20041223	US 2003-600609	2003 0623
AU 2004251156	A1	20050106	AU 2004-251156	2004 0527
CA 2529940	AA	20050106	CA 2004-2529940	2004 0527
WO 2005000773	A1	20050106	WO 2004-US16580	2004 0527

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,
 CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG,
 ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP,
 KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
 MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL,
 PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR,
 TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
 RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
 ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH,
 CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU,
 MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI,
 CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

EP 1651585 A1 20060503 EP 2004-753411 2004
0527

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,
MC, PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK
CN 1809521 A 20060726 CN 2004-80017411

2004
0527

PRIORITY APPLN. INFO.: US 2003-600609 A 2003
0623

WO 2004-US16580 W 2004
0527

OTHER SOURCE(S): MARPAT 142:56819

AB Chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes are described. The **catalyst** composition comprises palladium, silver, potassium, and an inorg. support material, where the **catalyst** composition contains <0.3% potassium. In the presence of sulfur-containing impurities (e.g., COS), these **catalysts** yield a much smaller increase in T1 (cleanup temperature) and higher ethylene selectivity is achieved (i.e., hydrogenation of acetylene into ethylene).

IT 7783-06-4, **Hydrogen sulfide**, uses
RL: CAT (Catalyst use); USES (Uses)
(**catalyst** component; chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)

RN 7783-06-4 HCAPLUS
CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H2S

IT 7440-05-3, Palladium, uses
RL: CAT (Catalyst use); USES (Uses)
(in chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)
RN 7440-05-3 HCAPLUS
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

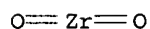
IT 1333-74-0, **Hydrogen, reactions**
RL: RCT (Reactant); RACT (Reactant or reagent)
(in chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)
RN 1333-74-0 HCAPLUS
CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 1314-23-4, Zirconia, uses 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 13463-67-7, Titania, uses
RL: CAT (Catalyst use); USES (Uses)

(support; chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)

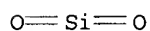
RN 1314-23-4 HCAPLUS
CN Zirconium oxide (ZrO₂) (8CI, 9CI) (CA INDEX NAME)



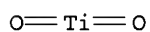
RN 1344-28-1 HCAPLUS
CN Aluminum oxide (Al₂O₃) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 7631-86-9 HCAPLUS
CN Silica (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



RN 13463-67-7 HCAPLUS
CN Titanium oxide (TiO₂) (8CI, 9CI) (CA INDEX NAME)



IC ICM C07C005-03
INCL 585259000

CC 35-2 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 48, 67

ST alkyne alkadiene chemoselective **catalytic** hydrogenation
alkene purifn; acetylene alkadiene chemoselective
catalytic hydrogenation alkene purifn

IT Disulfides

Thioethers

Thiols, uses

RL: CAT (Catalyst use); USES (Uses)

(**catalyst** components; in chemoselective hydrogenation
catalysts and their use in a process for the removal of
alkynes and alkadienes from alkenes)

IT Chemoselectivity

(chemoselective hydrogenation **catalysts** and their use
in a process for the removal of alkynes and alkadienes from
alkenes)

IT Alkenes, preparation

RL: IMF (Industrial manufacture); PEP (Physical, engineering or
chemical process); PUR (Purification or recovery); PYP (Physical
process); PREP (Preparation); PROC (Process)

(chemoselective hydrogenation **catalysts** and their use
in a process for the removal of alkynes and alkadienes from
alkenes)

IT Alkadienes

Alkynes

Cycloalkadienes

RL: RCT (Reactant); RACT (Reactant or reagent)

(chemoselective hydrogenation **catalysts** and their use
in a process for the removal of alkynes and alkadienes from
alkenes)

IT Hydrogenation

Hydrogenation **catalysts**

(chemoselective; chemoselective hydrogenation **catalysts**
and their use in a process for the removal of alkynes and
alkadienes from alkenes)

IT Aluminosilicates, uses

RL: CAT (Catalyst use); USES (Uses)

(support; chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)

IT 75-15-0, Carbon disulfide, uses 463-58-1, Carbonyl sulfide

7783-06-4, Hydrogen sulfide, uses

RL: CAT (Catalyst use); USES (Uses)

(**catalyst** component; chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)

IT 74-86-2, Acetylene, reactions 74-99-7, Propyne 77-73-6, Dicyclopentadiene 78-79-5, Isoprene, reactions 106-99-0, 1,3-Butadiene, reactions 107-00-6, 1-Butyne 463-49-0, Allene 503-17-3, 2-Butyne 504-60-9, 1,3-Pentadiene 513-81-5, 2,3-Dimethyl-1,3-butadiene 542-92-7, Cyclopentadiene, reactions 590-19-2, 1,2-Butadiene 591-93-5, 1,4-Pentadiene 591-95-7, 1,2-Pentadiene 592-42-7, 1,5-Hexadiene 592-44-9, 1,2-Hexadiene 592-45-0, 1,4-Hexadiene 592-48-3, 1,3-Hexadiene 598-23-2, 3-Methyl-1-butyne 627-19-0, 1-Pentyne 628-71-7, 1-Heptyne 629-05-0, 1-Octyne 693-02-7, 1-Hexyne 764-93-2, 1-Decyne 1118-58-7, 2-Methyl-1,3-pentadiene 3452-09-3, 1-Nonyne

RL: RCT (Reactant); RACT (Reactant or reagent)

(chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)

IT 7440-05-3, Palladium, uses 7440-09-7, Potassium, uses

7440-22-4, Silver, uses 7789-23-3, Potassium fluoride

20667-12-3, Silver oxide

RL: CAT (Catalyst use); USES (Uses)

(in chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)

IT 1333-74-0, Hydrogen, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(in chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)

IT 1314-23-4, Zirconia, uses 1344-28-1,

Alumina, uses 7631-86-9, Silica, uses

12651-25-1, Zinc titanate 13463-67-7, Titania, uses

37275-76-6, Zinc aluminate

RL: CAT (Catalyst use); USES (Uses)

(support; chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)

L144 ANSWER 5 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:737421 HCAPLUS

DOCUMENT NUMBER: 139:262461

TITLE: Preparation of a stable cobalt-phosphine hydroformylation **catalyst** containing sulfur compounds which suppress the formation of cobalt carbide in the reaction mixture

INVENTOR(S): Arnoldy, Peter; Ellison, Robert Hardy; Kuipers, Herman Pieter Charles Eduard; Moene, Robert; Van Der Steen, Frederik Hendrik

PATENT ASSIGNEE(S): Shell Oil Company, Neth.

SOURCE: U.S. Pat. Appl. Publ., 10 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 2003176742      A1      20030918      US 2002-294320
                                                    2002
                                                    1114

US 6777579         B2      20040817
CA 2466946         AA      20031002      CA 2002-2466946
                                                    2002
                                                    1114

WO 2003080550      A1      20031002      WO 2002-EP12857
                                                    2002
                                                    1114

W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,
    CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI,
    GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG,
    KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,
    MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE,
    SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
    VN, YU, ZA, ZM, ZW
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM,
    AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,
    DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT,
    SE, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML,
    MR, NE, SN, TD, TG
AU 2002367794      A1      20031008      AU 2002-367794
                                                    2002
                                                    1114

EP 1444187         A1      20040811      EP 2002-807099
                                                    2002
                                                    1114

EP 1444187         B1      20060329
R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,
    MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ,
    EE, SK
CN 1589251         A      20050302      CN 2002-822713
                                                    2002
                                                    1114

JP 2005519973      T2      20050707      JP 2003-578310
                                                    2002
                                                    1114

AT 321746          E      20060415      AT 2002-807099
                                                    2002
                                                    1114

ES 2256592         T3      20060716      ES 2002-2807099
                                                    2002
                                                    1114

ZA 2004003232      A      20050120      ZA 2004-3232
                                                    2004
                                                    0429

PRIORITY APPLN. INFO.:      US 2001-332809P      P
                                                    2001
                                                    1114

WO 2002-EP12857      W
                                                    2002
                                                    1114

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OTHER SOURCE(S): MARPAT 139:262461

AB A hydroformylation process is described that involves reacting a compound having at least one olefinic carbon-carbon double bond with hydrogen and carbon monoxide in the presence of a cobalt catalyst and a sulfur-containing additive (e.g., thiophene) which suppresses the formation of cobalt carbide in the reaction mixture

IT 1333-74-0, Hydrogen, uses 7440-48-4, Cobalt, uses 7783-06-4, Hydrogen sulfide, uses

RL: CAT (Catalyst use); USES (Uses)
 (in the preparation of a stable cobalt-phosphine hydroformylation
catalyst containing sulfur compds. which suppress the
 formation of cobalt carbide in the reaction mixture)

RN 1333-74-0 HCAPLUS

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

RN 7440-48-4 HCAPLUS

CN Cobalt (8CI, 9CI) (CA INDEX NAME)

Co

RN 7783-06-4 HCAPLUS

CN Hydrogen sulfide (H₂S) (8CI, 9CI) (CA INDEX NAME)

H₂S

IC ICM C07C045-49

ICS C07C029-16; C07C029-15

INCL 568429000; 568909000

CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and
 Waxes)

Section cross-reference(s): 67

ST cobalt hydroformylation **catalyst** prepn; carbide cobalt
 formation suppression hydroformylation **catalyst** prepn

IT Synthesis gas

(H₂-CO mixts.; in the preparation of a stable
 cobalt-phosphine hydroformylation **catalyst** containing
 sulfur compds. which suppress the formation of cobalt carbide
 in the reaction mixture)

IT Phosphines

RL: CAT (Catalyst use); USES (Uses)

(bicyclic; in the preparation of a stable cobalt-phosphine
 hydroformylation **catalyst** containing sulfur compds. which
 suppress the formation of cobalt carbide in the reaction mixture)

IT Hydroformylation **catalysts**

(preparation of a stable cobalt-phosphine hydroformylation
catalyst containing sulfur compds. which suppress the
 formation of cobalt carbide in the reaction mixture)

IT Disulfides

Sulfides, uses

Thioethers

RL: CAT (Catalyst use); USES (Uses)

(preparation of a stable cobalt-phosphine hydroformylation
catalyst containing sulfur compds. which suppress the
 formation of cobalt carbide in the reaction mixture)

IT Organic compounds, uses

RL: CAT (Catalyst use); USES (Uses)

(sulfur-containing; preparation of a stable cobalt-phosphine
 hydroformylation **catalyst** containing sulfur compds. which
 suppress the formation of cobalt carbide in the reaction mixture)

IT 92-85-3, Thianthrene 110-02-1, Thiophene 132-65-0,
 Dibenzothiophene 136-52-7, Cobalt octoate 624-92-0, Dimethyl
 disulfide 630-08-0, Carbon monoxide, uses 1313-82-2, Sodium
 sulfide, uses 1333-74-0, Hydrogen, uses
 7440-48-4, Cobalt, uses 7783-06-4,
 Hydrogen sulfide, uses 16721-80-5, Sodium
 bisulfide

RL: CAT (Catalyst use); USES (Uses)
 (in the preparation of a stable cobalt-phosphine hydroformylation
catalyst containing sulfur compds. which suppress the
 formation of cobalt carbide in the reaction mixture)

IT 51177-04-9P, Cobalt carbide

RL: BYP (Byproduct); PREP (Preparation)
 (preparation of a stable cobalt-phosphine hydroformylation
catalyst containing sulfur compds. which suppress the
 formation of cobalt carbide in the reaction mixture)

IT 13886-99-2

RL: CAT (Catalyst use); USES (Uses)
 (preparation of a stable cobalt-phosphine hydroformylation
catalyst containing sulfur compds. which suppress the
 formation of cobalt carbide in the reaction mixture)

REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L144 ANSWER 6 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:610442 HCAPLUS

DOCUMENT NUMBER: 137:155051

TITLE: Preparation of
silylorganomercaptans by
catalyzed hydrogenolysis of
 disulfides, trisulfides, and polysulfides

INVENTOR(S): Gedon, Steven C.; Hale, Melinda

PATENT ASSIGNEE(S): Crompton Corporation, USA

SOURCE: U.S., 6 pp.

CODEN: USXXAM

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 6433206	B1	20020813	US 2001-12286	2001 1115
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WO 2003040153	A1	20030515	WO 2002-US32608	2002 1011
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W: BR, CA, CN, JP, KR

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR,

IE, IT, LU, MC, NL, PT, SE, SK, TR

EP 1448570	A1	20040825	EP 2002-769065	2002 1011
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R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,

MC, PT, IE, FI, CY, TR, BG, CZ, EE, SK

BR 2002014066	A	20041013	BR 2002-14066	2002 1011
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JP 2005510520	T2	20050421	JP 2003-542198	2002 1011
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PRIORITY APPLN. INFO.:	US 2001-12286	A	2001 1115
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WO 2002-US32608	W	2002 1011
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OTHER SOURCE(S): CASREACT 137:155051

AB Organomercaptans of type (R1)3-Si-R2-SH [wherein R1 = (C1-C6)alkyl, (C1-C10)aryl, (C1-C6)alkoxy, or at least two of R1 and the silicon atom to which they are bonded form a ring system having up to about 12 ring members with no ethylenic unsatn. and optionally containing one or more heteroatoms selected from the group consisting of O, S, or N; R2 = divalent hydrocarbon group containing no ethylenic unsatn. and having up to about 20 carbon atoms] are prepared by reacting sulfides of general formula [(R1)3-Si-R2-S2Sm (m = 0-8) with hydrogen under hydrogenolysis conditions in the presence of a **catalytically** effective amount of Group VIII metal **catalyst** and in the presence of a **catalyst** poisoning inhibiting amount of a **catalyst** poisoning inhibitory agent selected from the group consisting of water, except where the **mercaptan product** contains at least one hydrolyzable silane group, (C1-C6)alkanol, H2S, and mixts. thereof. Thus, bis(3-triethoxysilylpropyl)disulfide undergoes hydrogenolysis **catalyzed** by nickel in the presence of ethanol to give 77.33 weight % of the corresponding **mercaptan**.

IT 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-48-4, Cobalt, uses
RL: CAT (Catalyst use); USES (Uses)
(preparation of silylorganomercaptans by catalyzed hydrogenolysis of disulfides, trisulfides, and polysulfides)

RN 7440-02-0 HCAPLUS
CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-05-3 HCAPLUS
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

RN 7440-06-4 HCAPLUS
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-16-6 HCAPLUS
CN Rhodium (8CI, 9CI) (CA INDEX NAME)

Rh

RN 7440-18-8 HCAPLUS
CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Ru

RN 7440-48-4 HCAPLUS
CN Cobalt (8CI, 9CI) (CA INDEX NAME)

Co

- IC ICM C07R007-08
 INCL 556627000
 CC 29-6 (Organometallic and Organometalloidal Compounds)
 Section cross-reference(s): 45
 ST **silylorganomercaptan prepn; sulfide**
 hydrogenolysis Group VIII **catalyst**
 IT Hydrogenolysis
 Hydrogenolysis **catalysts**
 (preparation of **silylorganomercaptans** by
catalyzed hydrogenolysis of disulfides, trisulfides,
 and polysulfides)
 IT Sulfides, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (preparation of **silylorganomercaptans** by
catalyzed hydrogenolysis of disulfides, trisulfides,
 and polysulfides)
 IT **Thiols, preparation**
 RL: IMF (Industrial manufacture); SPN (Synthetic preparation);
 PREP (Preparation)
 (silylorganomercaptans; preparation of
silylorganomercaptans by **catalyzed**
 hydrogenolysis of disulfides, trisulfides, and polysulfides)
 IT 1307-96-6, Cobalt oxide, uses 1313-27-5, Molybdenum trioxide,
 uses 7440-02-0, Nickel, uses 7440-05-3,
 Palladium, uses 7440-06-4, Platinum, uses
 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium,
 uses 7440-48-4, Cobalt, uses
 RL: CAT (Catalyst use); USES (Uses)
 (preparation of **silylorganomercaptans** by
catalyzed hydrogenolysis of disulfides, trisulfides,
 and polysulfides)
 IT 14814-09-6P, 3-Mercaptopropyltriethoxysilane
 60764-86-5P, Bis(3-(triethoxysilylpropyl)sulfide
 RL: IMF (Industrial manufacture); SPN (Synthetic preparation);
 PREP (Preparation)
 (preparation of **silylorganomercaptans** by
catalyzed hydrogenolysis of disulfides, trisulfides,
 and polysulfides)
 IT 64-17-5, Ethanol, uses 67-56-1, Methanol, uses 67-63-0,
 Isopropanol, uses 71-23-8, Propanol, uses 71-36-3, Butanol,
 uses 78-83-1, Isobutanol, uses 7732-18-5, Water, uses
 RL: NUU (Other use, unclassified); USES (Uses)
 (preparation of **silylorganomercaptans** by
catalyzed hydrogenolysis of disulfides, trisulfides,
 and polysulfides)
 IT 35112-74-4, Bis[3-(trimethoxysilyl)propyl] disulfide 40372-72-3,
 [Bis(3-triethoxysilyl)propyl]tetrasulfide 40550-17-2,
 Bis[(3-trimethoxysilyl)propyl]trisulfide 41453-78-5,
 Bis[3-(trimethoxysilyl)propyl]tetrasulfide 42169-82-4,
 Bis[3-(tributoxysilyl)propyl] disulfide 56706-10-6,
 Bis(3-triethoxysilylpropyl) disulfide 56706-11-7,
 Bis[3-(triethoxysilyl)propyl]trisulfide 57640-06-9 57640-07-0
 57640-08-1 57640-12-7 57640-13-8 63501-62-2 63501-63-3
 68704-61-0 70253-72-4 89552-63-6, 3-(Tributoxysilyl)propyl
 3-(trimethoxysilyl)propyl trisulfide 89552-64-7 137264-06-3
 167216-77-5 170573-43-0 170573-44-1 180003-68-3
 180003-70-7 180003-74-1 180003-75-2 180003-77-4
 180003-88-7 180003-90-1 180003-91-2 180003-92-3
 180004-00-6 180007-08-3 182814-38-6 182814-43-3
 188561-27-5 203457-58-3 243458-27-7 243458-31-3
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (preparation of **silylorganomercaptans** by
catalyzed hydrogenolysis of disulfides, trisulfides,

and polysulfides)

REFERENCE COUNT: 26 THERE ARE 26 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L144 ANSWER 7 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1991:470742 HCAPLUS

DOCUMENT NUMBER: 115:70742

TITLE: Hydrogen, **hydrogen sulfide**
and hydrocarbon coadsorption on platinum(111)
and platinum(110): selective **formation**
of **alkylthiols**

AUTHOR(S): Vassilakis, D.; Pradier, C. M.; Berthier, Y.;
Oudar, J.

CORPORATE SOURCE: Lab. Phys. Chim. Surf., Ec. Natl. Super. Chim.
Paris, Paris, 75005, Fr.

SOURCE: Applied Surface Science (1991), 47(3), 273-80
CODEN: ASUSEE; ISSN: 0169-4332

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Simultaneous adsorption of diolefin, hydrogen, and
hydrogen sulfide on platinum single crystals
induces **mercaptan** and **alkane formation**. The
nature, the amount and the temperature of desorption of these products
depend on the size and configuration of the diolefin and on the
structure of the surface. Mechanisms have been proposed to
interpret the observed surface reactions. Compds. are selectively
produced when H₂S reacts first with the diolefin; this
occurs with C₄H₆ on both (111) and (110) orientations and with
C₃H₈ on Pt(110). But hydrogen is the 1st to react with C₅H₈ on
Pt(111), leading thus to a whole series of **mercaptans**
and saturated hydrocarbons.

IT 7783-06-4, **Hydrogen sulfide**,
properties

RL: RCT (Reactant); RACT (Reactant or reagent)
(coadsorption and reaction of, with dihydrogen, and alkadienes
over platinum, mechanism of)

RN 7783-06-4 HCAPLUS

CN Hydrogen sulfide (H₂S) (8CI, 9CI) (CA INDEX NAME)

H₂S

IT 1333-74-0, Dihydrogen, properties

RL: RCT (Reactant); RACT (Reactant or reagent)
(coadsorption and reaction of, with **hydrogen**
sulfide and alkadienes over platinum, mechanism of)

RN 1333-74-0 HCAPLUS

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 7440-06-4, Platinum, properties

RL: PRP (Properties)
(coadsorption of dihydrogen, **hydrogen sulfide**
, and alkadienes on)

RN 7440-06-4 HCAPLUS

CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

- CC 22-7 (Physical Organic Chemistry)
 ST dihydrogen **hydrogen sulfide** alkadiene
 coadsorption platinum; alkyl thiol; **mercaptan**
 IT Alkadienes
 RL: PRP (Properties)
 (coadsorption of, with **hydrogen sulfide** and
 dihydrogen on platinum, mechanism of **alkylthiol**
formation from)
 IT Surface structure
 (effect of, on reaction between dihydrogen, **hydrogen**
sulfide, and alkadienes on platinum)
 IT Reaction mechanism
 (for reaction between alkadienes, dihydrogen, and
hydrogen sulfide over platinum)
 IT Alkanes, preparation
Thiols, preparation
 RL: PREP (Preparation)
 (from coadsorption of **hydrogen sulfide** and
 alkadienes on platinum, mechanism of)
 IT Redox reaction
 (of dihydrogen, **hydrogen sulfide**, and
 alkadienes over platinum, mechanism of)
 IT Redox reaction **catalysts**
 (platinum, for dihydrogen, **hydrogen sulfide**
 , and alkadienes, mechanism with)
 IT **Catalysts and Catalysis**
 (platinum, for reactions of alkadienes, dihydrogen, and
hydrogen sulfide)
 IT Electron emission
 (Auger, of carbon- and sulfur-platinum signals, reaction of
 dihydrogen, with **hydrogen sulfide** and
 alkadienes over platinum surface in relation to)
 IT Adsorption
 (co-, of dihydrogen, **hydrogen sulfide**, and
 alkadienes on platinum)
 IT 78-79-5, properties 106-99-0, 1,3-Butadiene, properties
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (coadsorption and reaction of, with dihydrogen and
hydrogen sulfide over platinum, mechanism of)
 IT 7783-06-4, **Hydrogen sulfide**,
 properties
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (coadsorption and reaction of, with dihydrogen, and alkadienes
 over platinum, mechanism of)
 IT 1333-74-0, Dihydrogen, properties
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (coadsorption and reaction of, with **hydrogen**
sulfide and alkadienes over platinum, mechanism of)
 IT 7440-06-4, Platinum, properties
 RL: PRP (Properties)
 (coadsorption of dihydrogen, **hydrogen sulfide**
 , and alkadienes on)
 IT 74-82-8P, Methane, preparation 74-84-0P, Ethane, preparation
 74-93-1P, Methyl **mercaptan**, **preparation**
 75-08-1P, Ethyl **mercaptan** 106-97-8P, Butane,
 preparation 107-03-9P, Propyl **mercaptan** 109-66-0P,
 Pentane, preparation 109-79-5P, 1-Butanethiol
 110-66-7P, 1-Pentanethiol 111-31-9P, 1-
Hexanethiol
 RL: FORM (Formation, nonpreparative); PREP (Preparation)
 (**formation** of, from alkadiene, dihydrogen, and
hydrogen sulfide over platinum, desorption
 and mechanism of)

L144 ANSWER 8 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
 ACCESSION NUMBER: 1990:77339 HCAPLUS

DOCUMENT NUMBER: 112:77339
 TITLE: Very active zeolites as useful
catalysts in the chemistry of highly
 sensitive compounds
 AUTHOR(S): Hoelderich, Wolfgang; Hesse, Michael; Sattler,
 Ewald
 CORPORATE SOURCE: Ammonia Lab., BASF, Ludwigshafen, 6700, Fed.
 Rep. Ger.
 SOURCE: Proc. - Int. Congr. Catal., 9th (1988), Volume
 1, 316-23. Editor(s): Phillips, M. J.;
 Ternan, M. Chem. Inst. Can.: Ottawa, Ont.
 CODEN: 56NZA9
 DOCUMENT TYPE: Conference
 LANGUAGE: English

AB Amines and **mercaptans** can be **synthesized** from
 olefins and NH₃ or H₂S in the presence of zeolite
catalysts. Reactions of phosphines and silanes with
 olefins in the presence of zeolites and aluminum phosphates (
prepared hydrothermally or by precipitation) were examined Addition of
 phosphines to olefinic double bonds gives higher yields than in
 the case of amination, and the results obtained with zeolites are
 superior to those achieved with phosphates. In hydrosilylations,
 too, zeolites are superior to phosphates but they do not offer
 such advantages over conventional **catalysts** as in the
 case of phosphorylation.

IT 7440-06-4, Platinum, uses and miscellaneous
 7440-16-6, Rhodium, uses and miscellaneous
 7440-48-4, Cobalt, uses and miscellaneous
 RL: CAT (Catalyst use); USES (Uses)
 (**catalysts** from zeolite containing, for the addition of
 phosphines and silanes to olefins)

RN 7440-06-4 HCAPLUS

CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-16-6 HCAPLUS

CN Rhodium (8CI, 9CI) (CA INDEX NAME)

Rh

RN 7440-48-4 HCAPLUS

CN Cobalt (8CI, 9CI) (CA INDEX NAME)

Co

CC 29-7 (Organometallic and Organometalloidal Compounds)
 Section cross-reference(s): 67, 78
 ST phosphine addn olefin zeolite **catalyst**; organophosphine
 synthesis zeolite **catalyst**; silane addn olefin zeolite
catalyst

IT Alkenes, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (zeolite-**catalyzed** addition reactions of, with
 phosphines and silanes)

IT Hydrosilylation
 (zeolite-**catalyzed**, of olefins)

IT Addition reaction **catalysts**
 (zeolites, for the addition of phosphines and silanes to alkenes)

IT Zeolites, uses and miscellaneous

- RL: CAT (Catalyst use); USES (Uses)
(Al, **catalysts**, for the addition of phosphines and silanes to olefins)
- IT Zeolites, uses and miscellaneous
RL: USES (Uses)
(Cr, boron-substituted, chromium-impregnated, **catalysts**, for the addition of phosphines and silanes to olefins)
- IT Zeolites, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(Fe, **catalysts**, for the addition of phosphines and silanes to olefins)
- IT Zeolites, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(boron-substituted, **catalysts**, for the addition of phosphines and silanes to olefins)
- IT 7440-06-4, Platinum, uses and miscellaneous
7440-16-6, Rhodium, uses and miscellaneous
7440-48-4, Cobalt, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(**catalysts** from zeolite containing, for the addition of phosphines and silanes to olefins)
- IT 7664-38-2, Phosphoric acid, uses and miscellaneous 7784-30-7
10043-35-3, Boric acid (H₃BO₃), uses and miscellaneous
12736-95-7, Aluminum phosphate silicate 15438-04-7
RL: CAT (Catalyst use); USES (Uses)
(**catalysts**, for the addition of phosphines and silanes to olefins)
- IT 593-68-0P 822-68-4P 2501-94-2P 4538-29-8P 15573-36-1P
95837-79-9P 120167-54-6P 120167-55-7P
RL: FORM (Formation, nonpreparative); PREP (Preparation)
(formation of, from zeolite-**catalyzed** addition of phosphines to olefins)
- IT 5037-65-0P 29681-57-0P
RL: FORM (Formation, nonpreparative); PREP (Preparation)
(formation of, from zeolite-**catalyzed** addition of silane to olefin)
- IT 593-54-4 993-07-7 1111-74-6 7803-51-2, Phosphine
RL: RCT (Reactant); RACT (Reactant or reagent)
(zeolite-**catalyzed** addition reaction of, to olefin or diene)
- IT 74-85-1, Ethene, reactions 110-83-8, Cyclohexene, reactions
115-07-1, 1-Propene, reactions 115-11-7, reactions 142-29-0, Cyclopentene 627-58-7 628-41-1, 1,4-Cyclohexadiene
RL: RCT (Reactant); RACT (Reactant or reagent)
(zeolite-**catalyzed** addition reaction of, with phosphines)
- IT 1335-30-4
RL: RCT (Reactant); RACT (Reactant or reagent)
(zeolites, Al, **catalysts**, for the addition of phosphines and silanes to olefins)
- IT 1335-30-4
RL: RCT (Reactant); RACT (Reactant or reagent)
(zeolites, Cr, boron-substituted, chromium-impregnated, **catalysts**, for the addition of phosphines and silanes to olefins)
- IT 1335-30-4
RL: RCT (Reactant); RACT (Reactant or reagent)
(zeolites, Fe, **catalysts**, for the addition of phosphines and silanes to olefins)
- IT 1335-30-4
RL: RCT (Reactant); RACT (Reactant or reagent)
(zeolites, boron-substituted, **catalysts**, for the addition of phosphines and silanes to olefins)

L144 ANSWER 9 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1971:476139 HCAPLUS

DOCUMENT NUMBER: 75:76139
TITLE: Conversion of alkyl mercaptans to
olefins and hydrogen sulfide
INVENTOR(S): Larsen, Arthur L.
PATENT ASSIGNEE(S): Marathon Oil Co.
SOURCE: U.S., 2 pp.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 3591652	A	19710706	US 1968-755434	1968 0826

PRIORITY APPLN. INFO.: US 1968-755434 A
1968
0826

AB C2H4 and H2S were obtained in high yield by contacting EtSH (I) with an Fe catalyst. Thus, I was passed at 0.25 ml/min through a pipe packed with Fe wool at 350°, and contact time at least 0.5 min to give 98% conversion into high quality C2H4.

IT 7439-89-6, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(catalysts, for ethanethiol conversion into ethylene)

RN 7439-89-6 HCAPLUS

CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

IC C07C

INCL 260677000

CC 23 (Aliphatic Compounds)

ST ethylene manuf; mercaptan catalyst olefin
prepn

IT Catalysts
(iron, for ethanethiol conversion into ethylene)

IT 7439-89-6, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(catalysts, for ethanethiol conversion into ethylene)

IT 75-08-1
RL: RCT (Reactant); RACT (Reactant or reagent)
(ethylene from, catalysts for)

IT 74-85-1P, preparation
RL: PREP (Preparation)
(from ethanethiol, catalysts for)

L144 ANSWER 10 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1968:476637 HCAPLUS

DOCUMENT NUMBER: 69:76637

TITLE: Mercaptans and sulfides from alpha
olefins

INVENTOR(S): Kite, George F.

PATENT ASSIGNEE(S): Gulf Research and Development Co.

SOURCE: U.S., 5 pp.
CODEN: USXXAM

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 3397243	A	19680813	US 1965-478464	1965 0809

PRIORITY APPLN. INFO.:	US 1965-478464	A	1965 0809
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AB The title compds. are prepared by reacting an α -olefin under anhydrous conditions with liquid H_2S in the presence of an acyclic azo initiator and a finely-divided metal. The ratio of mercaptans to sulfides in the product is increased by the addition of a mono or bis(thiol ester) to the mixture. Thus, 1-octene, 1 mole % azodiisobutyronitrile, and 27% Ni charged into a 300-ml. autoclave, and H_2S added until ratio of H_2S -octene was 4:1. The autoclave was heated rapidly with vigorous stirring to 83° for 3 hrs. to give 99% mixture of 77% mercaptans, and 23% sulfides.

IT 7440-02-0, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(catalysts, for hydrogen sulfide
reaction with α -olefins)

RN 7440-02-0 HCAPLUS

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

IT 7783-06-4, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(with α -olefins)

RN 7783-06-4 HCAPLUS

CN Hydrogen sulfide (H_2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

INCL 260609000

CC 23 (Aliphatic Compounds)

ST mercaptans sulfides via olefins; sulfides
mercaptans via olefins; olefins mercaptans
sulfides via

IT Catalysts
(2,2'-azobis[2-methylpropionitrile]-nickelas, for
hydrogen sulfide reaction with
 α -olefins)

IT Thiols, preparation
RL: PREP (Preparation)
(by hydrogen sulfide reaction with
 α -olefins)

IT Olefins, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(with hydrogen sulfide of α -)

IT 18496-25-8DP, Sulfide, dialkyl, preparation
RL: PREP (Preparation)
(by hydrogen sulfide reaction with
 α -olefins)

IT 507-09-5, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(catalysts from 2,2'-azobis[2-methylpropionitrile])

and nickel and, for **hydrogen sulfide**
reaction with 1-octene)
IT 110-05-4
RL: CAT (Catalyst use); USES (Uses)
(**catalysts** from nickel and, for **hydrogen**
sulfide reaction with α -olefins)
IT 78-67-1 7440-02-0, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(**catalysts**, for **hydrogen sulfide**
reaction with α -olefins)
IT 111-66-0
RL: RCT (Reactant); RACT (Reactant or reagent)
(reaction of, with **hydrogen sulfide**)
IT 7783-06-4, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(with α -olefins)

L144 ANSWER 11 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1968:59107 HCAPLUS

DOCUMENT NUMBER: 68:59107

TITLE: Ethyl **mercaptan prepared**
from ethylene and **hydrogen**
sulfide

INVENTOR(S): Constantinescu, Mircea; Constantinescu,
Teodor; Fedin, Tamara

PATENT ASSIGNEE(S): Romania, Ministry of the Chemical Industry

SOURCE: Rom., 2 pp.
CODEN: RUXXA3

DOCUMENT TYPE: Patent

LANGUAGE: Romanian

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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RO 44309		19661118	RO	1959 1229

AB New **catalysts** and an improved method of preparation were developed. **Catalysts** were made from powdered Fe, Co, or Ni nitrate, whose 20% solns. were impregnated on **Al₂O₃** powder at a ratio **Al₂O₃-metal** of 1.2:1 after drying; the mixture was dried at 110° and reimpregnated with a solution of 1% PtCl₄ or PdCl₄, so that Pt or Pd content in **catalyst** was 0.5% after drying; the obtained dry powder was then pelletized. Over this **catalyst** was passed; e.g., a reactant gas of **H₂S** and C₂H₄ at a volume ratio of 1:1.23, at a space velocity of 20 hr.⁻¹, at 230°, obtaining 67.3% EtSH. The apparatus is simple, working pressure is ambient, and **catalysts** are highly efficient.

IT 7783-06-4, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(addition reaction of, with ethylene, **catalysts** for)
RN 7783-06-4 HCAPLUS
CN Hydrogen sulfide (H₂S) (8CI, 9CI) (CA INDEX NAME)

H₂S

IT 7439-89-6, uses and miscellaneous 7440-02-0, ,
uses and miscellaneous 7440-05-3, uses and miscellaneous
7440-06-4, uses and miscellaneous 7440-48-4,
uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)

(catalysts, for addition reaction of ethylene with
hydrogen sulfide)

RN 7439-89-6 HCAPLUS
CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-02-0 HCAPLUS
CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-05-3 HCAPLUS
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

RN 7440-06-4 HCAPLUS
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-48-4 HCAPLUS
CN Cobalt (8CI, 9CI) (CA INDEX NAME)

Co

IC C07C
CC 23 (Aliphatic Compounds)
ST SULFIDE ETHYLENE HYDROGEN; ETHYL MERCAPTAN PREPN
; ETHYLENE HYDROGEN SULFIDE; HYDROGEN
SULFIDE ETHYLENE; MERCAPTAN PREPN
ETHYL
IT Addition reaction **catalysts**
(platinum metals-transition metals as, for ethylene with
hydrogen sulfide)
IT 7783-06-4, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(addition reaction of, with ethylene, **catalysts** for)
IT 74-85-1, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(addition reaction of, with **hydrogen sulfide**,
catalysts for)
IT 7439-89-6, uses and miscellaneous 7440-02-0,
uses and miscellaneous 7440-05-3, uses and miscellaneous
7440-06-4, uses and miscellaneous 7440-48-4,
uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(**catalysts**, for addition reaction of ethylene with
hydrogen sulfide)
IT 75-08-1P
RL: PREP (Preparation)
(manufacture of, from ethylene and **hydrogen**
sulfide, **catalysts** for)

L144 ANSWER 12 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1954:64082 HCAPLUS
 DOCUMENT NUMBER: 48:64082
 ORIGINAL REFERENCE NO.: 48:11306d-i,11307a-i,11308a
 TITLE: Carbonylization I. Interaction of acetylene with carbon monoxide and compounds having a reactive hydrogen atom; synthesis of $\alpha\beta$ -unsaturated carboxylic acids and their derivatives
 AUTHOR(S): Reppe, Walter; Magin, A.; Schuster, C.; Keller, R.; Kroper, H.; Klein, T.; Kerckow, F. W.; v. Blank, G.; Merkel, K.; Scheller, H.; Weschky, L.; Wolff, K.; Schweckendiek, W.; Hecht, O.; Gassenmeier, E.; Simon, A.
 CORPORATE SOURCE: Badische Anilin u. Sodafabrik, Ludwigshafen, Germany
 SOURCE: Ann. (1953), 582, 1-37
 DOCUMENT TYPE: Journal
 LANGUAGE: Unavailable
 OTHER SOURCE(S): CASREACT 48:64082
 GI For diagram(s), see printed CA Issue.
 AB cf. Reppe, "Chemie u. Technik der Acetylen-Druck Reaktionen," 2nd Ed. 1952. After an extensive discussion of the probable mechanism of the reaction between C_2H_2 (I), CO, and compds. with active H atoms, the various techniques used are outlined. The so-called "stoichiometric method" (A) is carried out at 40-2° with 1 mol I, 1, mole H_2O (or ROH), 0.25 mol $Ni(CO)_4$ (II), and 0.5 mol 40% HCl, with the residual air being replaced by N, giving 1 mol $H_2C:CHCO_2H$ (III) (or the R ester), 0.25 mol $NiCl_2$, and 0.25 mol H [which is never found as free H, but reacts further with III (or its esters), giving compds. described below]. In the laboratory, A was a batch process, but formed the basis of a continuous technol. process. The equipment used is shown in a sketch, and both laboratory and com. processes are described in detail, often with rather wide variations. The following esters of III were prepared in very good yields by means of A: Me, b150 30°; Et b760 100°; Bu (IV), b760 144-5°; $-(CH_2)_2-$ (V), b1-2 66-8°; $-(CH_2)_4-$ (VI), b0.6 73-86°; glyceryl, b2-3 118°; tetrahydrofurfuryl (VII), b1.5 55-70°; decahydro-1-naphthyl, (VIII) b14 135-8°; and Ph (IX), b1.5 50-60°. (In a number of cases these and other derivs. were lost during World War II, before full purification and characterization could be effected). The Me ester of III formed azeotropic mixts. with H_2O ; byproducts of the reaction were small amts. of III, $EtCO_2H$, and in some cases $EtCO_2Me$. In preparing the Et ester, a byproduct (due to partial hydrogenation and polymerization) is probably $MeCH:CHCH_2CO_2Et$, b760 141-5°, giving an unsatd. acid, $C_5H_8O_2$, on saponification and forming $Me(CH_2)_3CO_2Et$ on hydrogenation with Pd- $CaCO_3$. Another product of the above reaction is an Et tetrahydrobenzoate, b760 193°, probably formed by a cyclizing polymerization involving 2 mol I and 1 mol III, with subsequent hydrogenation. Analyses of products from A included acid and saponification nos., ester number, and the "hydrogenation number" (i.e. the g. H added at the double bond by 10,000 g. of substance). Techniques for purifying products from A are described in detail. With AcOH in place of HCl in A, the following were prepared: (from $MeC.tplbond.CC_6H_{13}$ and H_2O), a mixture of $MeCH:C(C_6H_{13})CO_2H$ and $C_6H_{13}CH:CMcCO_2H$, b15 150-53°; (from I and decahydro-2-naphthol), VIII (polymerizing readily); (from butynol and H_2O), $MeC(OH):CMcCO_2H$, b1-2 113-15°; (from I and PhOH), IX; (from I and $(CH_2OH)_2$), V; (from I and $(CH_2CH_2OH)_2$), a mixture of VI and $CH_2:CHCO_2(CH_2)_4OH$, b5-6 80-115°; (from I and tetrahydrofurfuryl, alc.), VII. Another method of prepn . (B) involved the action of various catalysts on equimolar mixts. of I and CO at about 30 atmospheric in suitable autoclaves. Of the 48 possible catalysts studied, Ni salts alone or admixed with other compds. proved the most

satisfactory, although in many instances there occurred undesirable side reactions, that are discussed in detail. $\text{NiBr}_2(\text{Ph}_3\text{P})_2\text{C}_4\text{H}_9\text{Br}$ (X), m. 178° (C.A. 43, 6202a) was a most effective catalyst, giving only about 5% of a mixture (XI) of byproducts. In the preparation of IV during the course of 37 days, 250 kg. BuOH containing 1.5% X and 1% BuBr was processed at 175° in a "V2A" high pressure tube with a 1:1 mixture of I and CO, at 30 atmospheric, giving a BuOH solution containing 53% IV and small amts. of XI; the latter (60% of which could be distilled) gave 15% of Bu-allylacetate, b₈ $72-3^\circ$, small amts. of Bu valerate, b₈ $84-5^\circ$, about 20% Bu butoxypropionate, b₁ $90-1^\circ$ (identified after saponification as the Ag butoxypropionate), about 10% Bu fumarate b₁ $122-3^\circ$, and about 10% Bu tetrahydrophthalate, b₁ $163-5^\circ$. When, in method A, $\text{Fe}(\text{CO})_5$ was substituted for II, and HCl, small amts. of p-C₆H₄(OH)₂, and some preformed ester of III were used, only about 28% III Et ester was obtained. Similarly, low yields of IV resulted. By modifying A (using AcOH, PhMe as solvent and 1-(1-naphthyl)-pyrrolidine or p-C₆H₄(OH)₂ as polymerization inhibitors with the appropriate mercaptan), the following ill-smelling, easily polymerized esters of $\text{H}_2\text{C}:\text{CHCOSH}$ were prepared: dodecyl b_{0.4} $121-33^\circ$; PhCH₂ b_{0.8} $94-103^\circ$; Ph b₁₀ $150-80^\circ$; and p-MeC₆H₄ b_{0.6} $89-94^\circ$. Similarly HSCH₂CO₂H gave $\text{H}_2\text{C}:\text{CHCOSCH}_2\text{CO}_2\text{H}$ b_{1.6} $100-20^\circ$ (decomposition). PhC.tplbond.CH and EtSH gave $\text{H}_2\text{C}:\text{CPhCOSEt}$, b₁ $120-40^\circ$. H_2S with I and II gave the difficultly purifiable $\text{CH}_2:\text{CHCOSH}$ (properties not given). By method A, with PhMe and HCl, I, II, and EtNH₂, gave the dimer $(\text{CH}_2:\text{CHCONHET})_2$ (XII), b₉ $105-7^\circ$; similarly, BuNH₂ gave $(\text{CH}_2:\text{CHCONHBu})_2$ (XIII), b₁ $146-50^\circ$. PhNH₂ (in H₃PO₄) gave the monomer $\text{CH}_2:\text{CHCONHPh}$, (XIV), m. $101-2^\circ$. Urea in AcOH gave an uncharacterized polymer; dicyclohexylamine (in AcOH and xylene) gave $\text{CH}_2:\text{CHCON}(\text{C}_6\text{H}_{11})_2$, b₁₅ $196-206^\circ$ AcNH₂ in aqueous AcOH gave an (unanalyzed) compound b₁₁ $200-20^\circ$; and pyrrolidine in AcOH gave the acrylopyrrolidide, b₁₀ $106-8^\circ$. By modifications of method B, the appropriate amines treated with I and CO (catalysts and solvents given in parentheses) yielded the following acrylamides: (NiI₂ SiO₂-gel, and C₆H₆) XII; K₂Ni(CN)₄-SiO₂ and C₆H₆) XIII; (Ni(CN)₂ and p-C₆H₄(OH)₂ in H₂O) $\text{CH}_2:\text{CHCONEt}_2$, b₃ 71° , together with appreciable amts. of $(\text{CH}_2:\text{CHCONEt}_2)_2$, b₁₈ 186° (NiI₂ and C, in PhMe) XIV; (NiI₂ and SiO₂ in xylene) $(\text{CH}_2:\text{CHCONPh}_2)_n$, b₁₀ $190-210^\circ$. To 950 g. MeCN, 50 g. H₂O and 100 g. NiBr₂ was added with constant stirring a 1:1 mixture of I and CO at 20 atmospheric and this pressure maintained by further addns. over 50 h., giving 400 g. III, 130 g. anhydride of III, b₁₀ $65-7^\circ$, and 120 g. (low) polymers of III, together with an appreciable amount of a polymeric still residue. By a slightly modified method A, C₆H₁₃C.tplbond.CH in aqueous AcOH gave 1-octene-2-carboxylic acid, b_{0.6} $98-100^\circ$, m. -6° (Et ester, b₁₀ $98-99^\circ$). Similarly from PhC.tplbond.CH with H₂O, EtOH, and PhNH₂, resp., were formed $\text{CH}_2:\text{CPhCO}_2\text{H}$, m. 105° , its Et ester, b₁₇ $124-5^\circ$, and its anilide, m. $149-50^\circ$. At 50° , 36 g. MeC.tplbond.CPh, 150 cc. Me₂CO, 150 cc. H₂O, 15 cc. AcOH, and 40 g. II gave a mixture of PhCH:CMeCO₂H, m. $74-8^\circ$, and MeCH:CPhCO₂H, m. $129-30^\circ$. Similarly, when EtOH was used, the products included the Et esters of these acids, and a still residue, which with aqueous NaOH, followed by acidification, gave an acid, b_{0.6} $131-2^\circ$. PhC.tplbond.CPh, Me₂CO, AcOH, H₂O, and II gave trans-PhCH:CPhCO₂H, m. $172.5-3^\circ$ (after vacuum sublimation); Et ester, b_{1.2} $141-8^\circ$. By method A, from $\text{CH}_2:\text{CHC.tplbond.CH}$ under N with EtOH, HCl, and p-C₂H₄(OH)₂ were formed (mainly) the dimer EtO₂CC:CH.CH₂.CH₂CH[C(CO₂Et):CH₂].CH₂ (?) (XV) (analyses lost), b₂ $135-7^\circ$, as well as small amts. of a compound Cl₂H₁₆O₄, m. 110° , presumably a monoester related to XV. Hydrogenation of XV (crude) with a Ni-Cr catalyst in MeOH gave the tetrahydro derivative of XV, b₂₀

162-5° (fully analyzed). Inasmuch as no EtCHMeCO₂H was formed in this reaction, it is probable that, in the **prepn** of XV, no stable monomer [CH₂:C(CO₂Et)CH:CH₂] was formed.

IT 7440-02-0, Nickel
(salts, as **catalysts** in C₂H₂ reaction with CO and alcs. or H₂O)
RN 7440-02-0 HCAPLUS
CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

CC 10 (Organic Chemistry)

IT **Catalysts**
(in acetylene reactions, with CO and alcs. or water, Ni salts as)
IT Nickel, compound with 1-bromobutane and Ph₃P
(as **catalyst** in C₂H₂ reaction with CO and alcs. or H₂O)
IT Phosphine, triphenyl-, compound with NiBr₂
(as **catalysts** in acetylene reaction with CO and alcs. or H₂O)
IT 854458-40-5, Butane, 1-bromo-, compound with triphenylphosphine
878756-23-1, Butane, 1-bromo-, compound with NiBr₂
(as **catalyst** in acetylene reaction with CO and alcs. or H₂O)
IT 854458-40-5, Phosphine, triphenyl-, compound with 1-bromobutane
(as **catalysts** in acetylene reaction with CO and alcs. or H₂O)
IT 105-75-9, Fumaric acid, dibutyl ester 492-38-6, Atropic acid 591-68-4, Valeric acid, butyl ester 1199-77-5, Cinnamic acid, α-methyl- 1734-78-7, Cinnamic acid, α-methyl-, ethyl ester 2051-76-5, Acrylic anhydride 2210-24-4, Acrylanilide 2274-11-5, Ethylene glycol, acrylate (di-) 2399-48-6, Furfuryl alcohol, tetrahydro-, acrylate 2478-10-6, 1,4-Butanediol, acrylates 2675-94-7, Acrylamide, N,N-diethyl- 3287-54-5, 2-Nonenoic acid, 2-methyl- 3618-41-5, Octanoic acid, 2-methylene-, ethyl ester 3760-10-9, Octanoic acid, 2-methylene- 4412-10-6, Crotonic acid, 2-phenyl- 4431-32-7, Malonic acid, di-2-propynyl- 5459-38-1, Acrylin, tri- 19756-11-7, α-Toluenethiol, acrylate 22286-82-4, Atropic acid, ethyl ester 22692-57-5, Succinamide, N,N,N',N'-tetraethyl- 24446-63-7, Acrylic acid, 2,3-diphenyl-, ethyl ester 25999-14-8, Acrylamide, N,N-dicyclohexyl- 32593-07-0, 2-Propenamide, N,N-diphenyl-, homopolymer 40233-96-3, Crotonic acid, 2-phenyl-, ethyl ester 42104-70-1, Pyrrolidine, 1-acryloyl- 61880-97-5, Crotonic acid, 2-hexyl- 64859-23-0, Atropanilide 79663-99-3, Cyclohexenecarboxylic acid, ethyl ester 86887-94-7, 1-Dodecanethiol, acrylate 89463-77-4, Acetic acid, mercapto-, ester with **thiolacrylic acid** 94400-15-4, **Benzenethiol**, acrylate 98694-27-0, Cyclohexene-1,2-dicarboxylic acid, dibutyl ester 180526-05-0, Crotonic acid, 3-hydroxy-2-methyl- 205812-71-1, Atropic acid, **thiol**-, ethyl ester 205812-71-1, **Ethanethiol**, atropate 833454-23-2, Cyclohexaneacetic acid, 3-carboxy-α-methyl-, diethyl ester 854721-10-1, 3-Cyclohexene-1-acetic acid, 3-carboxy-α-methylene-, ethyl ester 856080-62-1, 1-Naphthol, decahydro-, acrylate 872827-92-4, p-Toluenethiol, acrylate
(preparation of)
IT 7440-02-0, Nickel
(salts, as **catalysts** in C₂H₂ reaction with CO and alcs. or H₂O)